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CRUSTACEA.

(Vol. II, 1907.)

I.—DECAPODA.

BY W. T. CALMAN, D.Sc.

Two species of Decapod Crustacea were obtained by the 'Discovery' within the Antarctic Circle. They have been identified with the two species collected by the German Polar Commission of 1882-1883 at South Georgia. By the courtesy of Dr. Georg Pfeffer, of the Hamburg Museum, who first described the species, I have been able to compare the 'Discovery' specimens with co-types from South Georgia, and to satisfy myself of their identity. With the circumpolar range implied by their occurrence at these two widely separated points, both species combine a remarkable range in depth, for, whereas at South Georgia they were found at 7-9 fathoms, the 'Discovery' dredged both species at depths reaching to 500 fathoms.* Dr. Pfeffer's descriptions, although very detailed and accurate, leave unnoticed certain characters which are now regarded as of systematic importance. I have, therefore, found it necessary to supplement his account on some points. One of the species, *Crangon antarcticus*, has received some attention in recent discussions on the subject of "bipolarity," and I have therefore attempted to define a little more precisely its affinities with related forms.

FAMILY HIPPOLYTIDÆ.

CHORISMUS ANTARCTICUS.

Hippolyte antarctica Pfeffer, Jahrb. Hamburg. Wiss. Anst. IV. (1887), p. 51, pl. i. figs. 22-27.

Description of ovigerous females.—Total length 87 to 101 mm. Length of carapace (including rostrum) about two-fifths of total length of body. Rostrum equal to or a little longer than the distance from the orbital notch to posterior margin of carapace in the middle line, curved upwards, moderately expanded below; upper margin with eight or nine teeth, of which the second is placed over, or a little in front of, or

* *Crangon antarcticus* was also dredged by the 'Belgica' at a depth of 400-500 fathoms in Lat. 71° S., Long. 88° W.

in one case a very little behind the orbital notch, and the last two are close to the apex of the rostrum; lower margin with six to nine teeth (usually seven.) No supra-orbital teeth, antennal tooth distinct from the lower orbital angle, antero-lateral corner of carapace with a minute (pterygostomial) tooth.

Third abdominal somite with dorsal surface strongly elevated or "humped," but without a definite tubercle as in *Chorismus tuberculatus*. Sixth abdominal somite without movable lateral spines.

Peduncle of antennules reaching to or nearly to two-thirds the length of rostrum, third segment one-half the length of second, spine of first segment ("stylocerite") narrow and acute, reaching to middle or quite to end of second segment; flagella subequal, or inner slightly longer than outer, extending beyond tip of rostrum by one-third to nearly half their length. Antennal scale broad, about equal in length to rostrum, outer edge distinctly and evenly convex, apex broadly rounded, outer spine short.

Mandible with small incisor process and palp of three segments, the first broader than, and as long as the second. Third maxilliped extending nearly to tip of antennal scale, terminal segment twice the length of preceding. Exopod well developed.

First leg extending beyond penultimate segment of third maxilliped, carpus slightly excavate distally, about equal in length to the hand. Second leg extending beyond tip of antennal scale, carpus of eleven, merus of three, and ischium of two segments. Remaining legs moderately stout, fifth leg extending forwards nearly to tip of antennal scale.

Telson not greatly narrowed distally, tip rounded, with seven spines. Inner plate of uropods subequal to the telson and very little shorter than the outer plate, which is broadly rounded at the tip.

The branchial system comprises five pleurobranchiæ on each side on the last five thoracic somites, an arthrobranchia on the third, and a podobranchia on the second maxilliped. There are epipods on the third maxillipeds and on the first two pairs of legs.

Young males (55–59 mm. in length) and *females* (42 mm.) Body a little more slender and the rostrum relatively longer, distinctly exceeding the length from orbit to back of carapace. Flagella of antennule little longer than rostrum. Outer edge of antennal scale straight. In two specimens (♂ and ♀) there are twelve segments in carpus of second leg.

The co-typical specimen of *Hippolyte antarctica* used for comparison is an ovigerous female, about 60 mm. in total length. It agrees perfectly with the 'Discovery' specimens except in the following points:—Of the seven teeth on the upper edge of the rostrum only one is close to the point, not two, as in our specimens; the antennal scale is slightly longer than the rostrum, and its outer edge (as in our specimens of similar size) is nearly straight; the third maxillipeds are a

little shorter, and their terminal segment is hardly twice the length of the preceding; the carpus of the first legs is a little shorter than the hand.

Remarks.—This species agrees with the type of the genus *Chorismus* (*C. tuberculatus*, Sp. Bate.) in the characters given in my recently published synopsis of the *Hippolytidæ* ('Ann. Mag. Nat. Hist.,' xvii., 1906, p. 30), and further in having no supra-orbital spines, in the mandible-palp being composed of three segments,* the gills seven in number on each side, and the last three pairs of legs without epipods. It differs in having eleven or twelve segments in the carpus of the second legs while *C. tuberculatus* has only nine, in having an exopod on the third maxilliped, and in the fact that the first segment of the mandibular palp is not shorter than the second.

Occurrences.—January 22, 1902. 500 fathoms, 1 ♂.

W.Q., February 28, 1902. Less than 20 fathoms, 1 ♂, 1 ♀.

W.Q., January 10, 1903. 130 fathoms, 2 ♀.

W.Q., May 14, 1903. 127 fathoms, 1 ♂, 1 ♀.

W.Q., June 18, 1903. 130 fathoms, 2 ♀.

Fragments of this species were taken from the stomachs of seals on several occasions.

FAMILY CRANGONIDÆ.

CRANGON † ANTARCTICUS.

C. antarcticus Pfeffer, Jahrb. Hamburg. Wiss. Anst. iv. (1887), p. 45, pl. i., figs. 1–21; Coutière, C. R. Acad. Sci. Paris, cxxx. (1900), p. 1640; and Bull. Mus. Paris, vi. (1900), p. 240.

Description of females (not ovigerous).—Total length, 37·5–77 mm. General form slender. Surface of the carapace very uneven, with strongly marked ridges and hollows; in particular, a more or less sharply defined ridge runs backwards from the median dorsal spine for a distance equal to one-half the length of the carapace. The ridge running backwards from the antennal spine is continuous with that running forwards from the hepatic spine. Rostrum long, slender, compressed and acute, in one case nearly one and a half times as long as the eye-stalks. Abdomen long and slender, sixth somite generally more than one-sixth of total length of body. A pair of slender acute spines on hind margin of fifth somite dorso-laterally. Sixth somite with a strongly-marked double dorsal keel. Telson rounded at the tip, with a median spiniform point. Antennular peduncle slender, the distal end of first segment narrower than one-half the greatest diameter of the eye; outer lobe of first segment nearly flat, broadly ovate, produced anteriorly into a rather feeble spiniform point which does not reach distal

* Spence Bate defines the genus *Chorismus* as having a "biarticulate synhipod" ('Challenger Rep.' Macrura, p. 616), but he elsewhere correctly states that there are three segments (t.c. pp. 577 and 618).

† Recent reforms in nomenclature having rendered most of the well-known generic names of Crustacea unintelligible without an explanatory footnote, it is necessary to state that I use the name *Crangon* for the genus of which the common shrimp is the type.

end of segment. Antennal scale with outer margin straight, or, in smaller specimens, concave. Third maxillipeds extending to or slightly beyond end of scale. First legs extending a little beyond middle of terminal segment of third maxillipeds; hand from nearly four to nearly five times as long as broad, terminal tooth of palmar edge at about one-fourth of the length of the hand from distal end. Last pair of legs extending forward to the tip of the antennal scale. Endopod of first pleopod articulating with distal inner angle of peduncle.

Branchial system.—Five pleurobranchiæ on each side, on the last five thoracic somites; no arthro- or podo-branchiæ.

Remarks.—The 'Discovery' specimens differ from Dr. Pfeffer's description, and from a co-typical specimen with which I have compared them, in the more slender form of the body, due especially to the greater length of the sixth abdominal somite; in the greater length of the rostrum; in the shorter lobe on the basal segment of the antennule, reaching only to about the distal third of the segment, while in the typical form it reaches nearly to the end; and in the narrower "hand" of the first legs. But while each of the three well-preserved specimens in this collection differs from the co-type in all these points, they do so in varying degree. The differences are at least as important as some of those which have been regarded as of specific value by recent writers on the Crangonidæ, but I do not think that they would justify us, at present, in separating the form inhabiting the area explored by the 'Discovery' from that found in the very distant region of South Georgia.

The following table gives some measurements, in millimetres, of the co-type of *C. antarcticus* as compared with the three most perfect specimens in the 'Discovery' collection. All the specimens appear to be females or immature males.

		Total Length.	Length of Carapace from back of Orbit.	Length of Rostrum from back of Orbit.	Length of Sixth Abdominal Somite.	Length of Telson.	Ratio Length to Breadth of "Hand."
<i>C. antarcticus</i> , co-type	... ..	46·0	9·75	2·5	7·5	9·0	3·9
'Discovery,' January 27, 1902	... ..	58·0	11·75	4·75	10·0	12·5	4·9
„ March 4, 1904	... ..	77·0	17·0	—	13·0	15·0	—
„ January 22, 1902	... ..	37·5	8·0	2·3	7·5	8·0	—

Dr. Pfeffer* was the first to draw attention to the apparent "bipolarity" in the distribution of the genus *Crangon*. With the exception of the very imperfectly known *C. capensis*, Stimpson, from the Cape of Good Hope, *C. antarcticus* is the only species of the genus inhabiting the Southern Hemisphere, and is widely separated from all the other species, which are confined to the temperate and (if *Sclerocrangon* be

* Die niedere Thierwelt des antarctischen Ufergebietes. Internat. Polarf. Deutsch. Exped., ii. (1890), pp. 520-572.

included) the Arctic regions of the Atlantic and Pacific. The question has been discussed by Dr. Ortmann,* who concludes that *C. antarcticus* is specially and closely related to the Californian *C. franciscorum*, Stimpson, and that its presence in the Southern Hemisphere is to be explained by migration from the North along the West coast of America, where the hydrographical conditions are such as to favour an intermixture of northern and southern faunas across the tropic zone.

With a view to testing this conclusion of Dr. Ortmann's, I have carefully compared the specimens of *C. antarcticus* with specimens of *C. franciscorum* in the Museum collection.† The chief character on which Dr. Ortmann relies for linking the two species together is the presence of a pair of dorso-lateral spines on the hind margin of the fifth abdominal somite. This character is conspicuous and definite, but it may be doubted whether it is of great morphological importance. Prof. Sars figures a pair of spines of varying length in nearly the same position in all the larvæ of *Crangonidæ* examined by him,‡ and it seems likely that this larval character may have been retained independently in species not closely related. In other respects *C. franciscorum* differs considerably from the Antarctic species. The surface of the carapace is much less uneven, the various ridges and hollows being much less strongly marked. There is no ridge running backward from the median dorsal spine, and the ridge connecting the antennal and hepatic spines is interrupted by a groove. The pterygostomial spine is not compressed and expanded laterally as it is in *C. antarcticus*. The rostrum is shorter than the eye-stalks, depressed and hollowed on the dorsal surface and bluntly pointed. The sixth abdominal somite is about one-seventh of the total length, and has only a faintly-marked indication of a double keel on its dorsal surface. The telson narrows gradually to an acute tip. The antennular peduncle is stout, the distal end of the first segment broader than three-fourths of the greatest diameter of the eye; the outer lobe of the first segment has its external margin strongly bent upwards, thickened and produced forwards into a strong spine which reaches the distal end of the segment. The outer edge of the antennal scale is slightly convex. Miss Rathbun states (Harriman Alaska Exp., Crustacea, p. 120) that the third maxillipeds do not reach the end of the antennal scale, but in two out of three specimens examined by me they certainly do so. The first legs reach the tip of the third maxillipeds; the palmar edge of the hand is very oblique, its terminal tooth being more than one-third of the length of the hand from the distal end. The last pair of legs reach to about the middle of the antennal scale. The first pleopod differs considerably in shape from that of *C. antarcticus*, the endopod being attached nearly half-way down the inner margin of the peduncle.

* Jenaische Denkschr., VIII. (Semon's Zool. Forschungsreise V.), (I) (1894), p. 77; Proc. Acad. Nat. Sci., Philad., 1895, p. 190; Zool. Jahrb., Syst., IX. (1897), p. 582.

† These specimens, received from the Smithsonian Institute, are labelled as having been collected in California by Stimpson himself, in the course of the North Pacific Exploring Expedition, and may therefore be regarded as co-types.

‡ Bidrag til Kundskaben om Decapodernes Forvandlingar, iii. Fam. Crangonidæ. Arch. Math. Naturvid. xiv. (1890), pp. 132-195, pls. i.-vi.

A difference which may possibly be of greater importance than any of those mentioned above exists, as Prof. Coutière has pointed out, in the branchial system. In addition to the five pleurobranchiæ possessed by *C. antarcticus*, *C. franciscorum* has on each side a well-developed arthrobranchia at the base of the third maxilliped. The statements made by various writers as to the gill-formula of the common shrimp, and of the genus of which it is the type, are curiously conflicting. Although Huxley, in 1878, Boas, in 1880, and Claus, in 1886, gave the number of gills in *C. vulgaris* correctly as six, more recent authors seem to have overlooked the arthrobranchia of the third maxilliped, which, although small, is not at all difficult to see. Sars, in 1890,* gives among the characters distinguishing *Crangon* from *Pontophilus*, the presence of five gills in the former and six in the latter genus, and this statement is copied by Mr. Stebbing.† Ortman, in his revision of the *Crangonidæ* in 1895,‡ names a number of species of *Crangon* which he has examined and found to have only five gills. One of the names mentioned, "typicus," does not appear elsewhere in the paper, but it may be conjectured that it refers to the typical form of the species *C. vulgaris*. Two other species on the list are *C. affinis* and *C. franciscorum*. In these three species, and also in *C. allmanni* and *C. nigricauda*, I find, on the contrary, that the arthrobranchia is well developed. In the absence of trustworthy data as to the occurrence of this gill in the other species from the northern hemisphere, it is not possible to estimate the importance to be attached to its absence in *C. antarcticus*. It may be noted, however, that it is absent in the characteristically Arctic genus (or subgenus) *Sclerocrangon*, which is otherwise not very sharply defined from *Crangon*, and to which, in its strongly sculptured carapace, the present species has some resemblance. Prof. Coutière, in his preliminary notes on the Decapoda of the 'Belgica,' has called attention to this resemblance to *Sclerocrangon*; but he suggests, with some hesitation, the establishment of a new subgenus, *Notocrangon*, for the Antarctic species. I have not been able to examine the structure of the male pleopods, to which he attaches some importance, but the other characters which he mentions do not seem to me to justify this step.

Larvæ.—A number of larvæ of this species were collected, all in a stage of development corresponding to the "last larval stage" of Prof. Sars. The rostrum is very long and slender, extending well beyond the eyes. There is a small median dorsal tooth on the carapace, about midway between the back of the orbit and the "cervical" groove, and a little in front of it is a rounded papilla (represented in some of Sars's figures) probably representing the problematical "dorsal organ" of some Euphausiid larvæ. The abdomen is unarmed, except for the paired spines at the posterior end of the fifth somite, which are long and slender, almost as in Sars's figures of the larvæ of *Pontophilus*, and, as in that genus also, the sixth somite is very long. The telson is very large, in the form of an almost equilateral triangle, with the posterior margin

* Arch. Math. Naturvid, xiv. (1890), p. 153.

† Hist. Crustacea (1893), p. 227.

‡ Proc. Acad. Nat. Sci.,

Philad. (1895), p. 175.

concave, but not deeply notched. All the appendages are present. The first legs are subchelate. The second legs are (as in the other species of the genus *Crangon*) devoid of exopods. The pleopods are large but uniramous. There are only four gills on each side, corresponding to the first four legs.

Occurrences.—January 13, 1902. 100 fathoms, off Coulman Island, 1 ♀.

January 22, 1902. 500 fathoms, 1 ♂ (juv.) (?).

January 27, 1902. 300 fathoms, off Barrier, 1 ♀.

March 4, 1904. 254 fathoms, 1 ♀.

Larvæ of this species were taken in Winter Quarters on September 13, 1902, February 8, 1903, March 10, 1903, and March 23, 1903.

Fragments were taken from the stomachs of seals on several occasions.

CRUSTACEA.

II.—CUMACEA.

BY W. T. CALMAN, D.Sc.

(1 Plate.)

THE collection of *Cumacea* obtained by the 'Discovery' is a very small one. In addition to a species collected at the Auckland Islands and omitted from the present report as not belonging to the strictly Antarctic fauna, it comprises only four species, two of which are represented by solitary specimens.

No *Cumacea* have hitherto been recorded from within the Antarctic Circle. In the sub-Antarctic region five species were got by the 'Challenger' at Kerguelen and described by Prof. Sars, and Dr. Zimmer has more recently described two species from South Georgia and four from Tierra del Fuego. I am unable to identify any of these species in the present collection.

On the other hand, I have regarded one of the forms got by the 'Discovery' as a variety of a species known hitherto from the North Atlantic and the Mediterranean. It is necessary to add, however, that I do not think much importance can be attached to this circumstance from the point of view of zoo-geography. In this connection I would refer to the emphatic statement of Dr. Giesbrecht, already quoted with approval by Dr. H. J. Hansen :—"Unsere Kenntnisse von der Microfauna der Küsten aussereuropäischen Meere sind kaum der Rede werth." My own work leads me to believe that the *Cumacea* will, in the future, illustrate most admirably the opinion of these two distinguished carcinologists. The species in question, *Campylaspis verrucosa*, was described by Prof. Sars in 1863, and, until 1901, it was only known from Norwegian seas. More recently it has been obtained by Mr. E. W. L. Holt off the West of Ireland, and by Dr. Lo Bianco in the Mediterranean, near Capri. There can be little doubt that, with appropriate methods of collecting, its known range might be vastly increased, and it might even be found to be continuous with that of the variety now described.

LEUCON AUSTRALIS.

(Text-figs. 1-3.)

Description of Oviparous female.—Total length, 3.5 mm. Carapace about two-sevenths of total length, compressed, the dorsal crest closely serrated throughout its whole length. Pseudorostrum horizontal or very slightly upturned, acute, a little less than one-fourth of total length of carapace. Antennal notch widely open, occupying the whole of antero-lateral margin. Antero-lateral angle prominent, triangular,

serrated on its lower edge. Antennules with the inner ramus of considerable size, longer than the first segment of outer ramus. Uropods a little longer than the last two somites together, peduncle shorter than the subequal rami and having five spines on its inner edge. Endopod with ten spines on its inner edge, without setæ on its outer edge, the proximal segment twice the length of the distal.

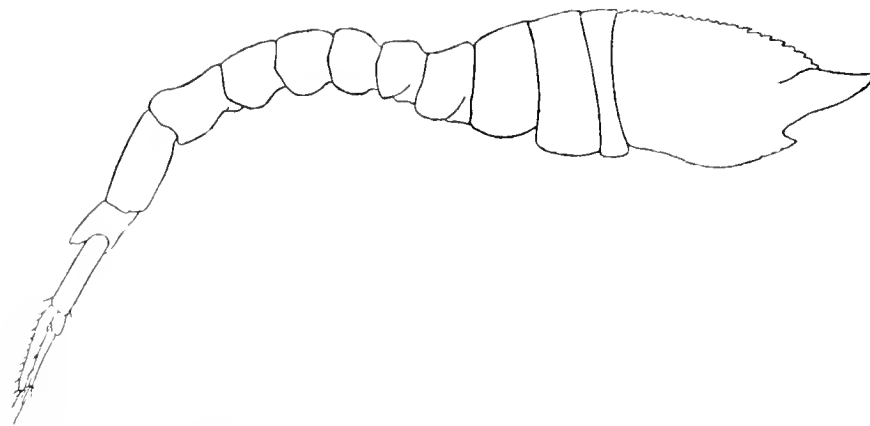


FIG. 1.—*Leucon australis*, ADULT FEMALE, FROM THE SIDE, APPENDAGES OMITTED.

Occurrence.—W.Q., June 15, 1902. D-net.

Remarks.—Among the thirteen species at present referred to the genus *Leucon*, four have the inner ramus of the antennule of considerable size, at least equal in length to the first segment of the outer. Of these, *L. longirostris*, Sars, *L. tenuirostris*, Sars, and *L. siphonatus*, Calman, have the antennal notch narrow and the

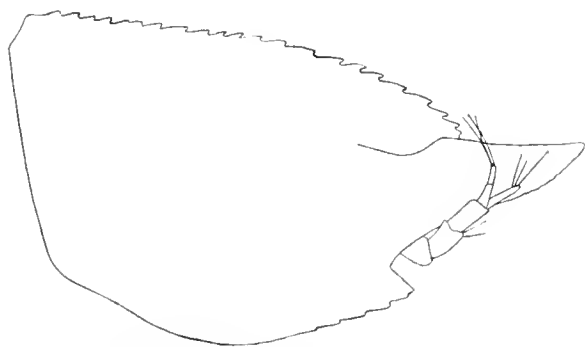


FIG. 2.—*Leucon australis*, CARAPACE AND ANTENNULE.

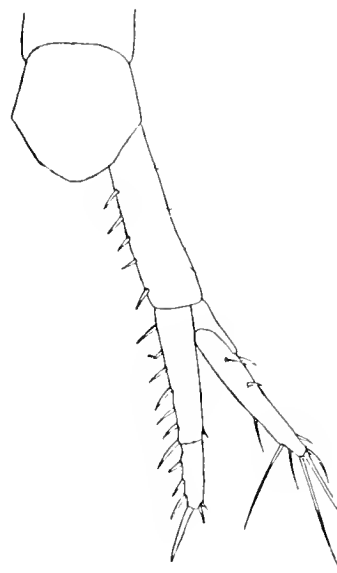


FIG. 3.—*Leucon australis*, LAST SOMITE AND UROPOD.

antero-lateral margin serrated above the notch. *L. septemdentatus*, Zimmer, from Tierra del Fuego, resembles the present species in the form of the antennal notch, but differs in the truncate pseudorostrum, in having the serrations of the dorsal crest confined to its anterior part, and the distal segment of the inner ramus of the uropods much less than half the length of the proximal segment.

EUDORELLA SIMILIS.

(Figs. 1-6 on Plate.)

Description of sub-adult female.—Total length 5.8 mm. The antero-lateral margin (fig. 2) of the carapace ends below in a strong curved tooth, above which the margin is concave, becoming convex and bearing about four very slightly marked teeth immediately below the well-defined antennal notch. Above the notch the margin is nearly straight, and is without teeth. The upper margin of the pseudorostrum is convex, without any projection behind, and bears a tuft of long setæ.

The penultimate abdominal somite bears on its posterior margin above a pair of very long setæ.

The antennules (figs. 3 and 3a) have both rami rather stouter than is usual in the genus and armed with strong spines.

The maxillipeds and legs agree very closely in their proportions and armature with those of *E. truncatula* as figured by Sars.

The uropods (fig. 6) show no conspicuous difference from those of *E. truncatula*, except that the rami are somewhat stouter.

Adult male.—Total length, 6 mm. The anterior margin of the carapace (fig. 4) is strongly convex, projecting well in front of the single small tooth which defines it below.

In the outer ramus of the antennule (fig. 5) the proximal segment is equal to the other three together. The inner ramus reaches to the end of the second segment of the outer.

Occurrences.—W.Q., June 15, 1902. D-net. Many specimens. 'Coulman Island, 100 fathoms,' 1 specimen.

Remarks.—Among the eight species of this genus which have been described from northern seas (North Atlantic and Mediterranean), *E. emarginata* (Krøyer) stands somewhat apart, having no distinct antennal notch in the carapace of the female. Of the remainder, only *E. hispida* and *E. nana*, G. O. Sars, agree with the present species in having a strong tooth at the antero-lateral angle of the carapace. In both of these species, however, the antero-lateral margin has strong teeth above as well as below the antennal notch in the female. The only species of *Eudorella* hitherto recorded from the Southern Hemisphere is *E. splendida*, Zimmer, from South Georgia. The figure of this species is not entirely satisfactory, but it suggests that the form of the antero-lateral margin of the carapace is very similar to that of the present species. The specimens examined by me might, in fact, have been identified with Dr. Zimmer's species, were it not that the latter has the upper edge of the pseudorostrum produced behind into a strong curved tooth, of which no trace is to be seen in the 'Discovery' specimens.

CUMELLA AUSTRALIS.

(Figs. 7-13 on Plate.)

Description of adult female.—Total length, 2.9 mm. Carapace large, about four-ninths of the total length, compressed, its greatest width little more than half its length. Seen from the side, its vertical height is about two-thirds of its length; the dorsal edge is strongly arched and serrated throughout its length. There are about twenty large teeth, with some smaller teeth between and beside them, especially in the posterior part. The anterior tooth of the dorsal crest is elevated above, and overhangs the ocular lobe, which is sub-globular and prominent. The pseudorostrum is short, vertically truncate and slightly oblique, the pseudorostral plates meeting in front of the ocular lobe for a distance equal to about half the diameter of the latter. As seen from the side, the fronto-lateral suture has a strong sigmoid curve; the antennal notch is wide and semi-circular; the antero-lateral angle is rounded and strongly serrated. The third of the free thoracic somites is produced dorsally into a pair of stout teeth, closely approximated in the middle line, curved upwards as seen from the side, and overhanging the following somite. The abdomen is a little shorter than the cephalothoracic region, the somites stout and cylindrical. The third maxillipeds resemble those of *C. pygmæa*, but the basipodite has about four teeth, the distal one very strong, on its inner margin. The meropodite also bears a stout tooth internally, and the carpopodite has a smaller one at the distal end of its inner edge. The first legs (fig. 9) are rather short and stout, about three-quarters the length of the carapace; the basipodite is about two-thirds the length of the remaining segments, with five strong teeth on the distal part of its outer edge, and one on its inner edge. The second legs (fig. 10) are very similar in proportions and armature to those of *C. pygmæa*. The third legs (fig. 11) have the basipodite slender and curved, longer by one quarter than the remaining segments together. The carpopodite is nearly twice the length of the meropodite, and $1\frac{1}{2}$ times as long as the propodite. The fourth legs (fig. 12) are similar to the third, but the fifth are much shorter. The basipodite is about two-thirds the length of the remaining segments. The uropods (fig. 13) have the peduncle a little less than twice the length of the last somite. The inner edge is serrated, beginning at about one-third of its length from the base, the serrations diminishing in size distally. The endopodite is about two-thirds the length of the peduncle, and carries a terminal spine of half its length. Its inner edge is serrated, and bears two (perhaps three) short spines. The exopodite is two-thirds the length of the endopodite, and has a long and slender terminal spine.

Occurrence :—‘W.Q., May 26, 1903.’ 1 specimen.

Remarks :—This species appears to be sufficiently distinguished from the three known species of *Cumella* by the larger carapace, with its strongly arched dorsal

edge, the numerous serrations of the dorsal crest, and the double tooth-like projection of the third free somite.

CAMPYLASPIS VERRUCOSA var. ANTARCTICA.

(Figs. 14-16 on Plate, and text-fig. 4.)

C. verrucosa, G. O. Sars, Nyt Mag. Naturvid. xv., p. 105 (1868); id., Crust. Norway, III., p. 90, pl. lxxiii. (1900); Calman, Cumacea, Fisheries, Ireland, Sci. Invest. 1904, I. (1905), p. 35; id., Mitth. Zool. Stat. Neapel, xvii. (1906), p. 424.

The Antarctic specimens which I refer to this species differ in the following points from all the northern specimens with which I have compared them:—

The hairs scattered over the surface of the body are much longer and more conspicuous, though not, apparently, more numerous. The sides of the carapace are

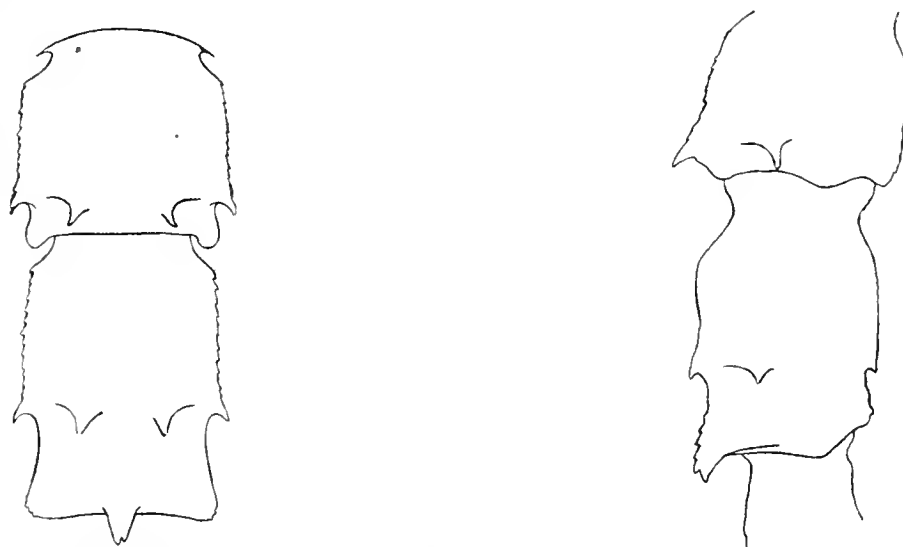


FIG. 4.—*Campylaspis verrucosa*, var. *antarctica*, FOURTH AND FIFTH SOMITES OF ABDOMEN, FROM ABOVE AND FROM THE SIDE.

more distinctly flattened or even slightly hollowed, especially over an oblique area, defined above and below by rows of tubercles, and corresponding apparently to the lateral groove of *C. sulcata*. The dorsal tubercles of the first five abdominal somites are replaced by sharp teeth (Text-fig. 4), pointing backwards, and having the edges more or less distinctly serrated; and they are accompanied on each somite by a pair of dorso-lateral teeth, which are hardly indicated in the northern specimens. The constriction of the fifth somite (Text-fig. 4) is much more strongly marked, and the posterior margin of the somite is produced, on the dorsal side, into a curved median tooth, serrated on the upper margin, in place of a small tubercle in the northern specimens. The thoracic limbs do not differ perceptibly in the form, relative proportions or armature of the various segments. The uropods (fig. 16) have the peduncle much more strongly serrated, and the teeth on the inner margin are spiniform, curved and irregular in size. The inner edge of the endopod is also more distinctly serrated. The specimens are larger than any others I have seen. Adult females measure 5.35 mm. in length of body.

For the purpose of comparison, I have examined a series of specimens of *C. verrucosa* from the West of Ireland and from the Mediterranean; those from the latter locality include some determined by Prof. Sars himself. These specimens, as I have elsewhere noted, show considerable variation among themselves and differ in some points from Prof. Sars's figures and description. In view of this variation, it does not seem possible to attribute specific value to the characters which distinguish the Antarctic from the northern specimens, more especially since I have only very few fully adult specimens of the latter.

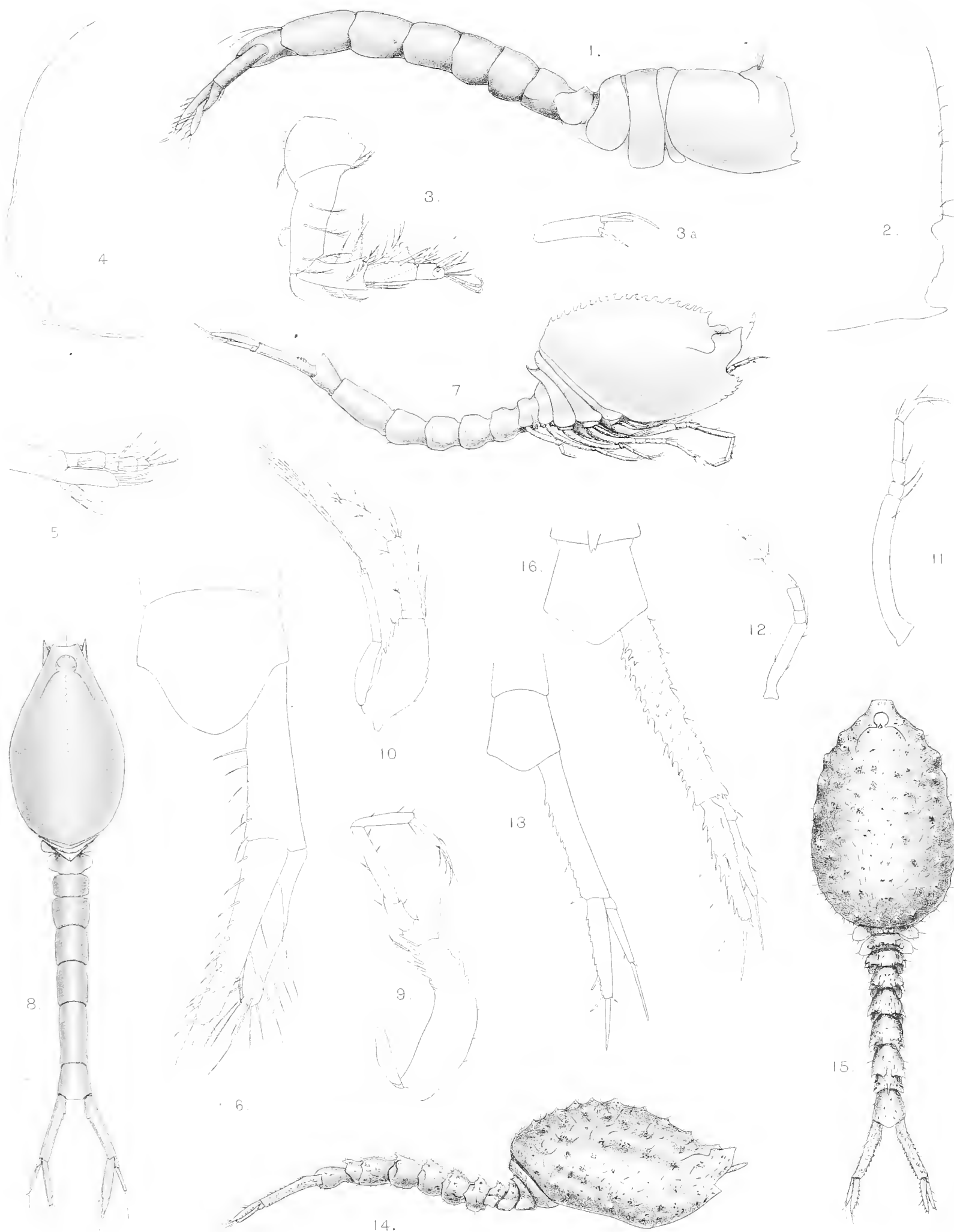
Campylaspis nodulosa, described by Prof. Sars from specimens obtained by the 'Challenger' at Kerguelen, is very similar to the present species, but the type specimens, although of large size (3.75 mm. in length according to my measurements*), are without any trace of the last pair of legs, and may, therefore, be presumed to be immature. The smallest specimens of *C. verrucosa* which I have seen are about 2.5 mm. long, and have the last legs already fully developed. The smallest of the 'Discovery' specimens are about the same size as the types of *C. nodulosa*, and they agree in all essentials with the adults. It is likely, therefore, that before attaining the adult state the Kerguelen form must grow to a size greatly exceeding that of the 'Discovery' specimens, and it will be necessary to wait until adult specimens are obtained before deciding what value is to be attached to the characters distinguishing it. The most important of these characters are the smaller relative size of the carapace, which is less than one-half of the length of the body, and the absence of any tubercles or teeth on the dorsal surface of the abdominal somites.

Occurrence :—'W.Q., Aug. 29, 1903, Sept. 8, 1903, and Feb. 13, 1904.' Many specimens.

EXPLANATION OF THE PLATE.

- | | | |
|---------|---|--|
| Fig. 1. | <i>Eulorella similis</i> , | sub-adult female, from the side, appendages omitted. |
| .. 2. | .. | .. front margin of carapace. |
| .. 3. | .. | .. antennule, 3a, inner ramus of same. |
| .. 4. | .. | adult male, front margin of carapace. |
| .. 5. | .. | .. terminal part of antennule. |
| .. 6. | .. | sub-adult female, last somite and uropod. |
| .. 7. | <i>Cumella australis</i> , | adult female, from the side. |
| .. 8. | .. | .. from above. |
| .. 9. | .. | .. first leg. |
| .. 10. | .. | .. second leg. |
| .. 11. | .. | .. third leg. |
| .. 12. | .. | .. fifth leg. |
| .. 13. | .. | .. last somite and uropod. |
| .. 14. | <i>Campylaspis verrucosa</i> , var. <i>antarctica</i> , | adult female, from the side, appendages omitted. |
| .. 15. | .. | .. from above. |
| .. 16. | .. | .. last somite and uropod. |

* Sars says "Nearly 5 mm.," which is a little too much, even if the uropods be included.





Handwritten: *Found on ice at base of*

CRUSTACEA.

III.—AMPHIPODA.

Handwritten: *(1915)*

BY A. O. WALKER, F.L.S.

(13 Plates.)

THE collection of Amphipoda consists of fifty-three species, of which eighteen are new to science, belonging to forty-three genera, of which four are new. This may not appear a very large number considering the length of time the 'Discovery' was in the Antarctic Seas, yet as (with the exception of the pelagic Hyperiid taken on the voyage) all but some nine species were collected from holes in the ice at the Winter Quarters, and, therefore, from a very limited area, it appears to me to reflect great credit on the energy and perseverance of Mr. Hodgson under unusual climatic conditions. The long sojourn of the 'Discovery' in one spot enables us to observe the seasons at which different species visit shallow water, generally for the purpose of depositing their ova or young. In the case of the most abundant species, *Orchomenopsis rossi*, A. O. W., of which Mr. Hodgson says that "It was quite the usual thing to take ten to thirty thousand at a haul," I only observed one male with fully developed lower antennæ and no females with ova, though some measured as much as 25mm. The young had probably been born at a considerable depth, and had at once made their way to comparatively shallow water, the parents remaining in deep water. Again, the almost equally abundant *Eusirus propinquus* (G. O. Sars) only exceeded 25mm. in four specimens, three females with ova or young measuring 48mm., and one male measuring 50mm. This species resembles in this respect *Gammarellus* [*Amathilla*] *homari* (Fabr.), which I have observed to visit the north coast of Wales in the early spring, when alone the large adult females, and more rarely males, measuring nearly 1in. in length, can be taken between tide-marks; in the summer months every tidal pool swarms with young specimens.

As in the Arctic Amphipoda, the Lysianassidæ greatly preponderate in the number of genera, species, and individuals. The typical Gammaridæ, as restricted by Mr. Stebbing in establishing the families Melphidippidæ and Lilljeborgidæ, are unrepresented. In Professor G. O. Sars' Amphipoda of Norway there are nine genera with twenty-one species; and in Professor Herdman's Ceylon collection seven genera with fifteen species.

Among the Gammaridæ several species are remarkable for their wide distribution: *Ampelisca macrocephala* (Lilljeborg) is an abundant Arctic species, though found also in

temperate seas; *Eusirus propinquus* (G. O. Sars) and *Melphidippa macrura* (G. O. Sars) have only been recorded before from the more northern waters of Norway; *Leucothoë spinicarpa* (Abildgaard) appears to be ubiquitous, and I am unable to see any difference between those taken from the ice-holes of the Winter Quarters and those from our own seas and the tropical seas of Ceylon and the Maldives. This is an ascidiicolous species, and probably owes its wide distribution to the drifting of its host by currents and winds. The same may be said of the two spongicolous species, *Polycheria antarctica* (Stebbing) and *Colomastix pusilla* (Grube), of which the former has also been taken in Ceylon, but not further north; while the latter has been found in the British Isles, the Mediterranean, and Ceylon, but is not recorded from Norway or Arctic seas. These species must have a great capacity of adaptation to extremes of heat and cold. On the other hand, *Orchomenopsis rossi* appears to be able to exist only in water just above the freezing point.*

As species remarkable for peculiarity of structure may be mentioned the following: *Hyperiopsis australis*, of anomalous structure, and belonging to a genus so rare that previous to the capture of the single specimen in this collection only two individuals of another, but nearly allied species, *H. Voeringii* G. O. Sars, had been taken off the coast of Norway; *Thaumateson herdmani* is the only known Amphipod which has its telson set on in a vertical plane; in the rest of the Stenothoidæ it is horizontal and generally spoon-shaped, with the concave side uppermost. *Epimeria macrodonta* is characterised by the long curved and sharp teeth on the body segments; while *Iphimedia hodgsoni* has these so densely clothed with fine spines directed backwards as to have a shaggy appearance. All the four species of *Iphimedia* in the collection are of very large size compared to the northern species, measuring from 20 to 45mm. in length. Lastly, the remarkable development of the meral joints of the last three pairs of peræopods in the adult males of *Seba antarctica*, may be mentioned.

CLASSIFIED LIST OF 'DISCOVERY' AMPHIPODA.

HYPERIIDÆ.†

FAM. VIBILIIDÆ, CLAUS.

GENUS VIBILIA, H. Milne Edwards.

V. propinqua, Stebbing.

FAM. CYLLOPIDÆ, BOVALLIUS.

GENUS CYLLOPUS, Dana.

C. magellanicus, Dana.

FAM. HYPERIIDÆ, DANA.

GENUS HYPERIA, Latreille.

H. gaudichaudi, Milne Edwards.

H. macronyx, A. O. Walker (1906).

* 'Southern Cross' Paper, Journ. Linn. Soc., XXIX., p. 45 (1903).

† For references to and descriptions of the Hyperiidæ, see "Bovallius, Monograph of the Amphipoda Hyperiidæ" (Kongl. Svenska Vetenskaps-Akademiens Handlingar, Band 21 and 22, 1887 and 1889).

GENUS HYPEROCHE, Bovallius.

H. lütkenides, A. O. Walker (1906).

GENUS HYPERIELLA, Bovallius.

H. dilatata, Stebbing.

GENUS EUTHIEMISTO, Bovallius.

E. gaudichaudi, Guérin.

FAM. ANCHYLOMERIDÆ, BOVALLIUS.

GENUS EUPRIMNO, Bovallius.

E. macropa, Guérin.

GAMMARIDEA.

FAM. HYPERIOPSIDÆ, BOVALLIUS.

GENUS HYPERIOPSIS, G. O. Sars.

H. australis, A. O. Walker (1906).

FAM. LYSIANASSIDÆ, G. O. Sars.

GENUS CHEIRIMEDON, Stebbing.

C. fougneri, A. O. Walker.*C. hansonii*, A. O. Walker.

GENUS WALDECKIA, Chevreux (1906).

W. obesa, Chevreux, Expn. Antaretique Française, p. 13.

GENUS ARISTIAS, Boeck.

A. antarcticus, A. O. Walker (1906).

GENUS ORCHOMENE, Boeck.

O. goniops, A. O. Walker (1906).

GENUS ORCHOMENELLA, G. O. Sars.

O. pinguiles, A. O. Walker.*O. franklini*, A. O. Walker.*O. chelipes*, A. O. Walker (1906).

GENUS ORCHOMENOPSIS, G. O. Sars.

O. rossi, A. O. Walker.

GENUS TRYPHOSA, Boeck.

T. murrayi, A. O. Walker.*T. kergueleni*, Miers.

GENUS URISTES, Dana.

U. gigas, Dana.

GENUS PODOPRIONIDES, A. O. WALKER (1906).

P. incerta, A. O. Walker (1906).

FAM. PHOXOCEPHALIDÆ, G. O. Sars.

GENUS HARPINIA, Boeck.

H. obtusifrons, Stebbing.

FAM. AMPELISCIDÆ, G. O. Sars.

GENUS AMPELISCA, Kröyer.

A. macrocephala, Lilljeborg.

FAM. STEGOCEPHALIDÆ, G. O. Sars.

GENUS EUANDANIA, Stebbing.

E. gigantea, Stebbing.

FAM. LEUCOTHOIDÆ, G. O. Sars.

GENUS LEUCOTHOË, Leach.

L. spinicarpa, Abildgaard.

FAM. STENOTHOIDÆ, G. O. Sars.

GENUS PROBOLOIDES, Della Valle.

P. antarcticus, A. O. Walker (1906).

GENUS PROBOLIELLA, A. O. Walker (1906).

P. typica, A. O. Walker (1906).

GENUS THAUMATELSON, A. O. Walker (1906).

T. herdmani, A. O. Walker (1906).

FAM. OEDICERIDÆ, G. O. Sars.

GENUS OEDICEROIDES, Stebbing.

Oe. nevnesi, A. O. Walker.*Oe. calmani*, A. O. Walker (1906).

FAM. EPIMERIIDÆ, G. O. Sars.

GENUS EPIMERIA, Costa.

E. inermis, A. O. Walker.*E. macrodonta*, A. O. Walker (1906).

GENUS EPIMERIELLA, A. O. Walker (1906).

E. macronyx, A. O. Walker (1906).

FAM. IPHIMEDIIDÆ, STEBBING.

GENUS IPHIMEDIA, Rathke.

I. pacifica, Stebbing.*I. echinata*, A. O. Walker (1906).*I. longipes*, A. O. Walker (1906).*I. hodysoni*, A. O. Walker (1906).

FAM. EUSIRIDÆ, G. O. Sars (1895).

GENUS EUSIRUS, Kröyer.

E. propinquus, G. O. Sars.*E. microps*, A. O. Walker (1906).

FAM. CALLIOPIIDÆ, G. O. Sars (1895).

GENUS ORADOREA, A. O. Walker.

O. longimana, A. O. Walker.

GENUS ATYLOIDES, Stebbing.

A. serraticauda, Stebbing.

GENUS STEBBINGIA, Pfeffer.

S. gregaria, Pfeffer.

GENUS PONGOGENEIA, Boeck.

P. magellanica, Stebbing.

FAM. ATYLIDÆ, G. O. Sars (1895).

GENUS ATYLUS, Leach.

A. walkeri, Stebbing (1906).

FAM. DEXAMINIDÆ, STEBBING.

GENUS POLYCHERIA, Haswell.

P. antarctica, Stebbing.

FAM. MELPHIDIPPIDÆ, STEBBING.

GENUS MELPHIDIPPA, Boeck.

M. macrura, G. O. Sars.

FAM. LILLJEBORGIIDÆ, STEBBING.

GENUS LILLJEBORGIA, Sp. Bate.

L. dubia, Haswell.

FAM. PHOTIDÆ, G. O. Sars (part).

GENUS HAPLOCHEIRA, Haswell.

H. barbimana, G. M. Thomson.

GENUS EURYSTHEUS, Bate.

E. longicornis, A. O. Walker (1906).

FAM. SEBIDÆ, A. O. WALKER (1906).

GENUS SEBA, Stebbing.

Seba antarctica, A. O. Walker (1906).

FAM. ISCHYROCERIDÆ, STEBBING.

GENUS HEMIJASSA, n.

H. goniamera, A. O. Walker.

FAM. COLOMASTIGIDÆ, STEBBING.

GENUS COLOMASTIX, Grube.

C. pusilla, Grube.

DESCRIPTION OF THE SPECIES.

UNLESS otherwise stated, the references to Professor G. O. Sars are to his "Crustacea of Norway," Vol. I., Amphipoda, 1895; those to Mr. Stebbing (Rev. T. R. R.) are to his 'Challenger' Report; and to A. O. Walker, to the Amphipoda of the 'Southern Cross' Antarctic Expedition, Journ. Linn. Soc., London, Zoology, Vol. XXIX. (1903), pp. 38-64.

The classification of the species is, as far as possible, in accordance with that of Professor G. O. Sars, in the "Amphipoda of Norway." After the completion of this memoir (on October 30, 1906) I received, through the kindness of the author, the Rev. T. R. R. Stebbing, F.R.S., a copy of his invaluable work on the Amphipoda Gammaridea, written for "Das Tierreich." As this will be indispensable to all systematic workers on the Amphipoda, and as it contains full references to all species described and published

up to May, 1906, I refer my readers to it where my references are insufficient. The nomenclature of the genera and species has been corrected to correspond with it.

I have not thought it advisable to give synonymic lists of the older species, as I have often found these to be sources of error, owing to mistaken identifications.

The following terms are used in the descriptions :—

“Pleon” = metasome, G. O. Sars ; the first three abdominal segments.

“Urus” = urosome, G. O. Sars ; the last three abdominal segments.

“Ocular lobe” = lateral angle of the head.

“Appendage” = secondary or accessory appendage of the upper antennæ.

In the peduncle of the antennæ, the “first joint” is the antepenultimate ; in the limbs it is the basipodite. The measurements are from the tips of the uropods to the base of the antennæ, when the amphipod is straightened.

FAM. VIBILIIDÆ, CLAUS.

VIBILIA PROPINQUA.

Vibilia propinqua, Stebbing.

1907.6.6.1-10

From lat. $54^{\circ} 01' S.$, long. $170^{\circ} 49' E.$ (27 Dec., 1901) to lat. $69^{\circ} S.$, long. $174^{\circ} E.$ (7 Jan., 1902) ; many specimens. The ‘Challenger’ specimens were taken in lat. $25^{\circ} 30' N.$, long. $130^{\circ} E.$ It has recently been recorded by Mr. Stebbing from the Bay of Biscay.*

The genus *Vibilia* has been partly revised by Herr Vosseler,† but his paper does not include the following species :—

- | | | | |
|-------|----|------------------------|--|
| 1892. | 1. | <i>V. erratica</i> , | Chevreaux, Bull. Soc. Zool. de France, 17 ^{me} année, pp. 32–35. |
| 1896. | 2. | <i>V. bovallii</i> , | Bonnier, Camp. du Caudan dans le Golfe de Gaseogne, Ann. Université de Lyon, p. 612, Pl. XXXV., fig. 3. |
| 1900. | 3. | <i>V. hirondellei</i> | } Chevreaux, Camp. scient. de l'Hirondelle (1885–8), Fasc. XVI.
Amphipodes, pp. 125–134, Pls. XV., XVI. |
| | 4. | <i>V. dentata</i> | |
| | 5. | <i>V. grandicornis</i> | |

Of these No. 1 is distinguished by the wrist of the second gnathopods being without the usual process. Nos. 3 and 4 belong to Bovallius' division, in which the lateral angles of the last urus segment are not produced backwards. No. 3 is said to be very near to *V. viatrix*, Bov., but distinguished by the presence of a rostrum (which, according to Vosseler, occurs also occasionally in *V. viatrix*), the rounded form of the epimeral plates of the first and second pleon segments, the partial coalescence of the two last urus segments, and the great length of the carpal process of the second gnathopods. No. 4 is characterised chiefly by the large size of the teeth on the palmar margin of the first gnathopod. No. 5 has the angles of the last urus segment produced in “deux petits prolongements latéraux, larges et arrondis.” In the present collection

* Trans. Linn. Soc. Zool., 2nd Ser., Vol. X., p. 31.

† Amphipoden d. Plankton Expn. 1 Teil. Hyperideæ, Mitt. Königlich. Nat. Kabinet, Stuttgart, 1901.

is a female *V. propinqua*, of 12mm., with seven or eight young, 3-5mm., which agree with *V. antarctica*, Stebbing, thus confirming Vosseler's opinion (*op. cit.*, pp. 118 and 120, note). These were taken in the steamship 'Morning,' lat. 67° 5' S., long. 179° 30' E. ✓

FAM. CYLLOPIDÆ, BOVALLIUS.

CYLLOPUS MAGELLANICUS.

Cyllopus magellanicus, Dana.

From lat. 51° 58' S., long. 170° 03' E. (26 Dec., 1901) to "past Cape Adare" (11 Jan., 1902); several specimens; length 12-14mm.

FAM. HYPERIIDÆ, DANA.

HYPERIA GAUDICHAUDI.

Hyperia gaudichaudi, M. Edw.

W.Q.,* 25 Dec., 1902, 6 fm., one young; W.Q., 6 and 7 May, 1903, one female, 25mm., one male almost as large, and an immature male, 16mm.; W.Q., 16 June, 1903, 15 fm., one female, 10mm.; W.Q., 5 May, 1904, 10 fm., one immature female and two young. ✓

HYPERIA MACRONYX.†

(Plate 1, fig. 1.)

Hyperia macronyx, A. O. Walker, Ann. and Mag. Nat. Hist. XVII. (1906), p. 452.

S.E. of Coulman I., 22 Feb., 1904, six specimens, immature, length of largest 10mm. W.Q., 16 April, 1903, 5 fm., one specimen. W.Q., 18 May, 1903, 10fm.; W.Q., 1 Aug., 1903, 10 fm., eight specimens. ✓

Head shorter than the first two segments. *Eyes* occupying the entire head. *Segments all free*; the three pleon-segments with a tooth on the hind epimeral angle. *Carpal process of the first gnathopods reaching the middle of the hind margin of the hand, which is ovate, less than twice as long as wide, the hind margin convex and finely serrate.* Carpal process of the second pair reaching considerably beyond the middle of the hand; the limb otherwise as in the first; branchiæ of first pair oblong, wider below; of second pair, pyriform.

First and second peræopods longer than the gnathopods: first joint a little wider than the fourth, which is twice as wide and about two-thirds as long as the fifth, with five long equidistant spines on the hind margin; the fourth and fifth joints have their hind margins finely serrate. *Dactyli* slightly curved, slender, about half as long as the fifth joint.

Third peræopods: First joint subequal to the fifth, about twice as long as wide,

* W.Q. = Winter Quarters.

† From the long dactyli of the peræopods.

widening near the middle; fifth joint half as long again and half as wide as the fourth, its front margin finely serrate. Dactyli as in preceding pairs.

Fourth and fifth peræopods: First joint narrower than in the third pair, and the front margin of the fifth smooth. *The fourth pair are subequal to the third and about one-fifth longer than the fifth.* Dactyli as in preceding pairs.

First uropods reaching to the end of the third, second a little shorter.

Third uropods: Peduncles broad, one-third longer than the rami, which are subequal, wide at the base, and acutely pointed; the outer edge of the outer ramus smooth the rest unequally serrate.

Telson equilaterally triangular, barely reaching the middle of the peduncle of the third uropods.

This species in the length of the peræopods and the relative proportions of the last three pairs approaches *Parathemisto*, with which it also agrees in the mouth-organs, but the widely expanded and produced wrist of the first gnathopods does not agree with either G. O. Sars' or Bovallius's* definition of that genus.

Length 10mm.

HYPEROCHE LUTKENIDES.

(Plate 1, fig. 2.)

Hyperocche lütkenides, A. O. Walker, Ann. and Mag. Nat. Hist. XVII. (1906), p. 453.

Lat. $57^{\circ} 25' 30''$ S., long. $151^{\circ} 43'$ E.; one male, length 12 mm.

Like *Hyperocche lütkeni*, Bovallius,† except in the following respects:—In the second pair of peræopods (fourth pair of Bovallius) the hind margins of the fourth and fifth joints are *not serrate*. In the third pair the fifth joint *is curved*.

The telson is *triangular, with rounded apex, rather longer than the width at the base, and reaching to the middle of the peduncles of the third uropods*.

The mandibular palp has the third joint almost as long as the first and second united as figured by Bovallius for *H. lütkeni*. In this respect both species differ from G. O. Sars' figure of *H. krøyeri*, Bov. [*H. tauriformis* (Sp. Bate and Westwood‡)], in which the third joint is shorter than the second.§

In the first pair of peræopods the hind margin of the fourth joint is prolonged in the form of a strong serrate tooth; in the second pair the tooth is smaller and not serrate, but the curved portion of the end of the joint between the tooth and the base of the fifth joint is so.

HYPERIELLA DILATATA.

Hyperiella dilatata, Stebbing.

Young specimens, abundant at W.Q. from Nov. to July, length 8–9mm.

* Bovallius, Amphipoda Hyperiidea, Part 2 (1889), p. 129.

† Bovallius, Amphipoda Hyperiidea, Part 2 (1889), p. 97, Pl. VII.

‡ British Sessile-eyed Crustacea, Vol. 2, App., p. 519.

§ Mr. W. M. Tattersall, who has kindly examined specimens of *H. tauriformis* from the W. of Ireland for me, informs me that the palp in the male resembles Bovallius's figure of *H. lütkeni*, while that of the female agrees with Sars' figure.

1907.6.6.33

1907.6.6.34-53

EUTHEMISTO GAUDICHAUDI.

Euthemisto gaudichaudi, Guérin.

Abundant from lat. $54^{\circ} 01' S.$, long. $170^{\circ} 49' E.$ to lat. $63^{\circ} 04' S.$, long. $175^{\circ} 43' E.$, mostly young—a female with ova measured 15mm.

1907.6.6.54-73

FAM. ANCHYLOMERIDÆ, BOVALLIUS.

EUPRIMNO MACROPA.

Euprimno macropa, Guérin.

One specimen, length 16mm., 26 Feb., 1904.

1907.6.6.74

FAM. HYPERIOPSIDÆ, BOVALLIUS.

HYPERIOPSIS AUSTRALIS. (Pl. 4, fig. 3.)

Hyperiopsis australis, A. O. Walker, Ann. and Mag. Nat. Hist. XVII. (1906), p. 454.

W.Q., 16 June, 1903, 15 fm.; one.

1907.6.6.75

Differs from *H. Vöringii*, G. O. Sars (Norweg. N. Atlantic Expn., p. 231), in the following points:—

The lower margin of the head is *oblique*.

The first segment of the urosome has a deep dorsal depression; the second segment is the longest of the three.

The third joint of the first and second peræopods is not quite twice as long as the next two united, and is about the same width, *i.e.*, the margins are parallel, the distal three-fourths of its length.

In the last peræopods the jointing is indistinct, the very long third (or fourth) joint is finely serrate and spinulose.

The first and second uropods are biramous. In his definition of the genus Sars says that they are “simple, two-jointed,” but as the rami cling closely together this might easily be an oversight.

The single specimen was not dissected (nor, probably, was Sars'), but the maxillipeds are evidently of the Gammarid type. Bovallius (Amphipoda Synopidea) has placed the genus in his tribe of Synopidea under the family Hyperiopsideæ.

FAM. LYSIANASSIDÆ, G. O. SARS.

CHEIRIMEDON FOUGNERI.

Cheirimedon fougneri, A. O. Walker.

W.Q., 8 Aug., 1902; No. 2 D., 4 fm.; one. W.Q., 1 Dec., 1902; Hut Point (123), one young. (*several*)

1907.6.6.76-81

CHEIRIMEDON HANSONI.

Cheirimedon hansonii, A. O. Walker.

Cape Adare, 24 Feb., 1904; Laminaria roots, 13–20 fm.; one, 4 mm. long.

1907.6.6.82

WALDECKIA OBESA. (Pl. 2, fig. 4.)

Waldeckia obesa, Chevreux. Expn. Antarctique Française (1906), p. 13.

Charcotia obesa, Chevreux, Bull. Soc. Zool. de France, Vol. XXX. (1906), p. 163.

1907.6.6.83-91 ✓ W.Q., 17 May, 1902, two; 4 Oct., 1902, off Castle Rock (107), 3; 27 Aug., 1902, two (one adult male); 5 March, 1903 (159), one large, one young; 10 March, 1903 (160), one large. ^{2 July}

Female, length 18 mm.

Body tumid: First four side plates at least twice as deep as the segments, the fourth wider at the lower margin than deep, and greatly extended behind to the hind margin of the side plate of the third peræopod; this is large, convex, and subquadrate, widest below, angles rounded. The posterior angle of the first pleon segment is rounded; that of the second acute; the third has the hind margin elevated dorsally in a blunt tooth, the posterior angle upturned and sub-acute, the hind margin of the epimere hollowed out just above it, and thence convex. The first segment of the urus is carinate, the hind margin dorsally elevated in a recurved point.

Head scarcely produced in front, a little longer than the first segment, speckled with red; ocular lobe produced to an acute point reaching to the end of the first joint of the upper antennæ. *Eyes* large, dark, elongate-reniform.

Upper antennæ a little longer than the head, reaching the middle of the flagellum of the lower; first joint as long as the flagellum, second very short, third almost covered by the second; flagellum twelve-jointed, the first joint longer than the next two, setose; appendage seven-jointed, reaching beyond the middle of the flagellum.

Lower antennæ: The first joint the shortest, the second the longest, curved and widening distally, the second and third together subequal to the twelve-jointed flagellum. In the male this reaches to the urus.

Mandibles: Palp robust; first joint about half as long as the second, which is rather longer than the third, the anterior margin of which is convex for one-third its length, then straight and fringed with setæ.

First maxillæ as in *Socarnes vahllei* (Krøyer), except the inner plate, which has four or five unequal plumose setæ.

Epistome with both lobes rounded.

Maxillipeds with the inner plates squarely truncate, with rather long setæ on the ends and inner margins.

First gnathopods: Side plates more than twice as deep as wide, oblong, with the front margin obtusely angulated near the insertion of the first joint, angles rounded. First joint wide, and as long as the remainder; wrist shorter than the hand and wider than its base. The hand is simple (not subchelate), tapering to the base of the strong curved dactylus, and setose on the hind and distal half of the front margins.

Second gnathopods: First joint fully as long as the remaining joints together; wrist longer and rather narrower than the hand, the hind margin of which is a little produced; dactylus distinct.

First peræopods: Side plates narrow, widening distally, curved. Coxopodite distinct, about one-third the length of the side plate. First joint subequal to the next two, widening distally; third joint rather wider at the distal end than the first at the same point; second, third, and fourth setose, fifth spinous on the hind margin.

Second peræopods: Like the first, except the side plates (see back).

Third peræopods: Side plates as deep as the leg is long, widening below, the hind margin angulate below, the front rounded. First joint wider than long, with the hind margin excavate and setose above and obscurely crenate below; hind margin of the third joint produced to the middle of the next and terminating in a spinous point; the front margin of all the joints except the first is armed with short spines.

Fourth peræopods: First joint subovate, very obscurely crenate behind.

Fifth peræopods: First joint much wider than that of the fourth pair, the hind margin distinctly crenate in the middle.

First and second uropods: The peduncles as long as the outer rami, the inner rather shorter.

Third uropods: Rami rather longer than the peduncles, the outer rather the longer, with spines on the outer and long setæ on the inner margin.

Telson cleft nearly to its base, reaching to the middle of the rami of the third uropods.

ARISTIAS ANTARCTICUS. (Pl. 3, fig. 5.)

Aristias antarcticus, A. O. Walker, Ann. and Mag. Nat. Hist. XVII. (1906), p. 454.

W.Q., 28 Feb., 1902, Millurdo Bay, 20 fm., one, length 15 mm.; D., 5 June, 1902, one smaller.

1907.6.6.92.93

Body moderately compressed, without carinæ or teeth.

Head shorter than the first segment; ocular lobe produced to the end of the first joint of the upper antennæ, rounded at the apex. *Eyes* large, dark, expanded below.

Body-segments increasing in length backwards. First four side-plates about as deep as the segments, the first concealed by the second; the fourth moderately produced behind; the fifth much wider than deep. Posterior angle of the third pleon segment produced backwards, acute. First urus segment depressed in front; second and third almost concealed by the first, and perhaps coalesced.

Upper and lower antennæ subequal, scarcely reaching the end of the third segment.

Upper antennæ: First joint rather longer than the second and third, the lower margin projecting distally; second twice as long as the third, lower margin projecting. Flagellum ten-jointed, the first joint setose, as long as the next three joints, which are distally setose. Appendage five-jointed, the first the longest, the rest subequal.

Lower antennæ: First joint twice as wide as long; second and third subequal, about three times as long as the first; flagellum ten-jointed.

Mandibles as in *A. neglectus*, Hansen,* but the projection from the molar tubercle, which appears to be membranaceous, is less prominent. The third joint of the palp is straight.

First and second maxillæ as in *A. neglectus*.

Maxillipeds as in *A. neglectus*.

First gnathopods: Side plates small, rather wider than deep. First joint as long as all the rest, four times as long as wide. Wrist longer and wider than the hand, unequally setose on the hind margin. Hand not subchelate, narrowing distally, the front margin convex, the hind slightly concave, spinulose along its entire length, with four spines at unequal intervals.

Second gnathopods: Side plates semi-oval, extending to about one-third of the first joint. First joint subequal to the next three united, widening to about one-fourth of its length from the distal end, then narrowing. Wrist longer and wider than the hand, the hind margin densely setose; hand with subparallel margins, both setose. Dactylus well developed.

First and second peræopods: Side plates rounded below, those of the second pair obtusely angulated about the middle of the hind margin. The fourth joint is about half as long and twice as wide at the distal end as the fifth; the hind margin of the latter terminates in an acute angle.

The remaining *peræopods* are subequal in length and structure, robust, the third joint expanded, the fourth with both margins produced downwards; the hind margins of the first joints in the third and fourth pairs are smooth, except the lower part, which is obscurely crenate; in the fifth pair the whole margin is serrate.

First and second uropods: Peduncles subequal to the outer rami, inner rather longer; all parts sparsely spinous. The first pair extend beyond the second and these beyond the third.

Third uropods: Inner rami lanceolate, as long as the peduncle, and reaching to the end of the first joint of the outer; margins finely spinulose.

Telson about as wide at the base as long, cleft about two-thirds of its length, divisions dehiscant, rounded.

Both specimens had the third and fourth peræopods turned up over the back.

ORCHOMENE GONIOPS.† (Plate 3, fig. 6.)

Orchomene goniops, A. O. Walker, Ann. and Mag. Nat. Hist. XVII. (1906), p. 455.

W.Q., 21 Aug., 1903; two specimens, probably immature; length 5 mm.

Body-segments increasing in length backwards. *First four side-plates* deeper than the segments, narrow. *Third pleon-segment* with a small postero-dorsal carina and hind and lower margins straight, the former crenate, the posterior angle rather less than 90°.

* Vidensk. Meddel. 1887 (1888), p. 67.

† γωνία, angle; ὤψ, face.

1907.6.6.94-95

Head shorter than the first segment; *ocular lobe* broadly triangular, produced beyond the end of the peduncle of the upper antennæ. *Eye* moderately large, oval, dark.

Upper antennæ: First joint three times as long as the next two united, naked. Flagellum 13-14-jointed, the first joint as long as the next three, sparsely setose on the upper side. Appendage 5-jointed, the first joint the longest, the third the shortest. *Lower antennæ* rather longer than the upper; peduncle reaching the end of the third joint of the flagellum of the upper; first joint the longest, second the shortest. *First gnathopods*: Side plates narrowed and rounded below; wrist two-thirds of the length of the hand, which is about twice as long as wide, with parallel margins, setose; palm rather oblique, convex, crenulate, defined by a spine. *Second gnathopods* as in *Orchomenella humilis* (Costa) [= *O. batei*, Sars]. *Third peræopods*: Side-plates wider than the depth in front, with the usual posterior lobe; first joint about half as large as the side-plate, deeper than wide; hind margin convex, serrate, produced down to the middle of the third joint; this is much produced behind and downwards. *The fifth peræopods* have the first joint nearly twice as deep as wide, and longer than the rest of the joints, including the dactylus, together, otherwise like the third pair; the dactyli of all the peræopods are very short.

The first uropods are subequal in extent to the second, exceeding the third; the peduncle is one-fourth longer than the subequal rami, all the parts very spinous on the upper margins. *Second pair* less spinous. Peduncle in the *third pair* rather longer than the outer ramus: inner ramus not nearly reaching the end of the first joint of the outer, its inner margin minutely serrate. *Telson* entire, deeply concave above, the end truncate with two setules: it extends beyond the end of the inner rami of the third uropods.

The difference between the telson of this species and that of the female *O. humilis* is only one of degree, as the truncate margin is slightly concave.

ORCHOMENELLA PINGUIDES.

Orchomenella pinguides, A. O. Walker.

W.Q., March to October, 1902; ten, 14½ fm.; length 10 mm.

1907.6.6.96-~~100~~

O. FRANKLINI.

O. franklini, A. O. Walker.

W.Q., 15 June, 1902; D net, nine, various sizes, length of largest 6.5 mm.
other localities

1907.6.6.116-125

O. CHELIPES. (Pl. 4, fig. 7.)

O. chelipes, A. O. Walker, Ann. and Mag. Nat. Hist. XVII. (1906), p. 456.

W.Q., 28 Feb., 1902; eight, 10 fm.

1907.6.6.136-143

Body moderately compressed; first and second segments subequal to the head and each other, remaining mesosome segments rather longer and subequal. First four side-

plates but little deeper than the segments. Hind margin of the epimere of the third pleon segment forming a rounded right angle with the straight lower margin. First urus segment as long as the remaining two, carinate; second shorter than third.

Head: The ocular lobe reaching the end of the first joint of the lower antennæ, rounded at its apex. *Eyes* large, wide-oval, dark red in spirit.

Upper antennæ: First joint about three times as long as the next two, naked; third shorter than the second. Flagellum in the female 11-jointed, the first as long as the next two, with a few long setæ below. Appendage 4-jointed, the first twice as long as the second, which is subequal to the third, the fourth minute, the whole very sparsely setose.

Lower antennæ slightly longer than the upper; flagellum 12-jointed, subequal to the peduncle.

Mouth organs as in *O. nana* (Kr.). The mandibular palp strong, with the second joint twice as long as the third.

First gnathopods: Side plates widening downwards, rounded in front, straight behind. First joint almost as long as the rest united; front margin of the wrist rather shorter than that of the hand; hand rather narrower than the wrist, slightly curved, *the hind margin produced distally so as to form an imperfect chela with the dactylus*; the oblique palm is finely pectinate and defined by two spines; the hind margins of the third, fourth, and fifth joints are densely fringed with short setæ.

Second gnathopods rather stout; side plates oblong, widening below. First joint about twice as long as the second, which is longer than the third; this has the hind margin densely pilose; wrist tumid, much longer and wider than the hand, the hind margin convex, scabrous; front margin straight, densely setose; hand densely setose, with a few strong curved and serrate spines over the insertion of the dactylus.

Second peræopods: Side plates moderately produced and angulate behind.

Third, fourth, and fifth peræopods of similar structure, increasing in size successively; the side plates of the third pair are wider than deep, and much larger than the first joints. The first joints in the three pairs are wide and obscurely crenate behind.

First uropods extending a little beyond the second, and these beyond the third; inner ramus of the third not reaching the last joint of the outer.

Telson barely reaching the end of the peduncle of the third uropods, deeply notched.

Recognisable by the peculiar form of the first gnathopods.

ORCHOMENOPSIS ROSSI.

Orchomenopsis rossi, A. O. Walker.

This species was taken in enormous quantity throughout the year, and is doubtless the one to which Mr. Hodgson refers in his "Preliminary Report," p. 398, as being "commonly taken 10,000 to 30,000 at a haul." It is noteworthy that it has not been

1909.6.6-144-173

taken either by the 'Discovery' or 'Southern Cross' north of lat. $77^{\circ} 50'$. Male specimens with the lower antennæ developed in the manner supposed to indicate sexual maturity are very scarce, yet in a gathering from Castle Rock Seal Hole, W.Q., $14\frac{1}{2}$ fm. (no date), there are a number which, though only 15 mm. long, have the flagella with 36 joints well furnished with calceoli; and from Hole 6, W.Q., 23 Feb., 1903, 130 fm. (153), there is a probably adult male of 25 mm., which appears to be the maximum size. There is some variability in the form of the third pleon segment, the hinder angle of which is less rounded in some specimens, especially the largest, than in others. Mr. Hodgson writes as follows:—

"This species was not regarded with favour when we were in Winter Quarters, and it is a matter of considerable regret that its seasonal development was not looked for; its migration it was impossible to follow. It occurred first in considerable numbers on the 17th May, 1902, when the winter was well advanced. On that occasion the trap was hauled from 56 fathoms about 4.0 p.m. and then it was so dark that I was obliged to return to the ship for a lantern. The trap contained about 10,000 of these amphipods. A thousand individuals were counted, the volume ascertained, and this formed the basis for the present estimate of number and for future occasions. Four fish were in the trap, one of them had been reduced to an absolute skeleton; on another the amphipods hung by their 'teeth' in a compact mass, completely concealing their victim. Its skin had disappeared, and I judged also about a millimetre of flesh, but the animal was still alive; the other two fish were presumably waiting their turn.

"From that date until 25th October, 1902, this species was taken generally in numbers varying between 10,000 and 30,000 at a haul, and this at all depths to 125 fm., which was our practical limit for ordinary work. Two or three times a trap was used in 173 fm., in July and August 1902, but not many amphipods were obtained—100 or so at a time. These animals swarmed over the bait to such an extent as to make it obvious they kept other animals away; otherwise the number of other animals captured was unaccountably small. Under these circumstances the presence of this amphipod was regarded as a nuisance, and as a large stock had been preserved, further captures were generally left on the ice at the mouth of the hole. My experience at the holes soon made it perfectly clear that there was no small mortality among the seals through their not being able to get to a breathing-hole in time during their wanderings, and thus affording a substantial food supply for predaceous crustacea. I came to the conclusion that these amphipods travel about the sea bottom in vast hordes in search of food, a conclusion further accentuated by the fact that from 25th October to 27th December, 1902, they completely disappeared from all the traps; stationary traps were not used during the same period of 1903. From October to January is the seals' breeding season, and at this time they remain, for the most part, close inshore. The place nearest the ship where they congregated most was among the pressure ridges at Pram Point. These ridges are formed by the 'Barrier' ice intruding into the Sound between White Island and Cape Mackay and pressing against the land at Pram Point. As the ice did

not go out during the season of 1902-3, the principal ridge became more than a mile long, the ice being pressed up to a height of twenty or thirty feet at the point of greatest pressure. Considering that the mortality among the seals would be much increased during the breeding season, it occurred to me that the amphipods might have migrated close inshore, more especially to Pram Point, as an area where a superabundant supply of food might be obtained. I went to investigate this matter, but the seals had made their holes among the irregular blocks of ice piled up in a confused manner. I found that the hole from the surface usually led on to a platform some two or three feet below; the hole which completed the passage through the ice had no relation to the one above, and was generally at some distance from it, and quite invisible from my point of view. As it turned out, I could not get a trap down any of the holes, so that the presence of these amphipods on the breeding-grounds of the seals is uncertain, and no explanation of their desertion of the traps in deeper water is forthcoming."

TRYPHOSA MURRAYI.

Tryphosa murrayi, A. O. Walker.

T. adareei, A. O. Walker.

1907.6.6.174-193 This is another abundant species, though not nearly so much so as *O. rossi*. The largest female measured 30 mm. It appears to occur from Cape Adare to lat. 77° 50', and was taken at the Winter Quarters throughout the year.

The examination of a large number of specimens has convinced me that the characters relied upon for the separation of *T. murrayi* and *T. adareei*, viz., the form of the hind margin of the third pleon segment and the carina on the first urus segment are very variable, and I have therefore united them.

TRYPHOSA KERQUELENI.

Lysianassa kergueleni, Miers.

Hippomedon kergueleni (Miers), Stebbing.

Hoplonyx kergueleni (Miers), A. O. Walker.

1907.6.6.174-198 Cape Wadsworth, 8-15 fm., 15 Jan., 1902, one, small; ✓ W.Q., 15 June, 1902, one, ✓ length 13 mm.; W.Q., 20 Sept., 1902, Castle Rock, 14½ fm., three. ✓ two. 9.1.02. one

URISTES GIGAS.

Uristes gigas, Dana.

Tryphosa antennipotens, Stebbing.

1907.6.6.199 Past Cape Adare, 11 Jan., 1902, one specimen.

PODOPRIONIDES.

Podoprionides, A. O. Walker, Ann. and Mag. Nat. Hist. XVII. (1906), p. 457.

Resembles *Podoprionella*, G. O. Sars, in the chelate first gnathopods and the deeply serrate first joints of the last three peræopods, but differs in the less compact

body, the structure of the mandibular palp and of the outer ramus of the third uropods. From *Podoprion*, Chevreux,* it differs in having the first joint of the fourth and fifth peræopods serrate like the third.

PODOPRIONIDES INCERTA. (Pl. 5, fig. 8.)

Podoprionides incerta, A. O. Walker, Ann. and Mag. Nat. Hist. XVII. (1906), p. 457.

W.Q., 29 Aug., 1902, Hole 12, D net, one specimen; length 2 mm.

Body not very compact; the anterior side plates small.

Upper antennæ reaching a little beyond the peduncle of the lower; appendage 2-jointed, the first twice as long as the second, which has a tuft of very long setæ at the extremity.

Lower antennæ: Peduncle stout, margins of third joint produced. *Mandibular palp with the third joint more than half as long as the second, narrow, pectinate.*

First gnathopods: Side plates less than half the length of the first joint, rounded in front, straight behind, with a notch and a spine above the angle. First joint rather longer than the remaining five, widening distally; second and third joints subequal; wrist subequal to the hand; *the hind margin of the hand is short, convex and prolonged in a spine-like process, which is slightly curved inwards to meet the point of the curved dactylus, forming a completely chelate joint; palm very oblique, smooth.*

Second gnathopods: Side plates oblong, about twice as deep as wide, angles rounded. First joint hardly as long as the next three; second longer and wider than the third; wrist about twice as long as the hand, which is oblong, setose on both margins, palm transverse. The last three pairs of *peræopods* have the first joints broadly ovate, the hind margins deeply serrate, as in *Podoprion*, Chevreux, and *Podoprionella*, Sars.

Uropods: First and second subequal in extent and scarcely exceeding the third pair; *the outer ramus in this pair has two subequal joints* and is but little longer than the inner. The telson could not be made out.

The single specimen was not dissected; the mouth-parts therefore could not be described.

FAM. PHOXOCEPHALIDÆ, G. O. Sars.

HARPINIA OBTUSIFRONS.

Harpinia obtusifrons, Stebbing.

W.Q., Oct.-Nov., 1902, Hut Point; three, length of largest 6 mm. W.Q., 15 June, 1902, D net, twelve young.

* Mémoires de la Société Zool. de France, Tome IV. (1891), p. 6, Pl. I.

FAM. AMPELISCIDÆ, G. O. SARS.

AMPELISCA MACROCEPHALA.

Ampelisca macrocephala, Lilljeborg.

1907.6.6.207-208 Coulman Island, 13 Jan., 1902, 100 fm. ; two males, length 18 mm. ✓

In these specimens the upper and lower antennæ appear to be subequal, and reach to the urus. They (especially the upper) are therefore considerably longer than in the northern form as figured by G. O. Sars. The lower margin of the first joint of the fifth pair of peræopods is more truncate than in the female specimen in the 'Southern Cross' collection.

FAM. STEGOCEPHALIDÆ, G. O. SARS.

EUANDANIA GIGANTEA ?

Euandania gigantea ? Stebbing.1907.6.6.209 W.Q., 20 Aug., 1903, Hole 12, D net ; one specimen, length 9 mm. ✓
Probably a young specimen ; not dissected.

FAM. LEUCOTHOIDÆ, G. O. SARS.

LEUCOTHOË SPINICARPA.

Leucothoë spinicarpa, Abildgaard.

1907.6.6.210-217 W.Q., 13 Sept., 1902, two ; 5 Nov., 1902, one ; 11 Nov., 1902, one ; 28 Nov., 1902, one ; 8 Sept., 1903, two ; 30 Sept., 1903, one.

I am unable to see any difference between these specimens and the European and Ceylon forms. The largest measured 15 mm.

FAM. STENOTHOIDÆ, G. O. SARS.

PROBOLOIDES ANTARCTICUS. (Pl. 5, fig. 9.)

Proboloides antarcticus*, A. O. Walker, Ann. and Mag. Nat. Hist. XVIII. (1906), p. 13.

1907.6.6.218-219 W.Q., from Feb. to Dec., 1902, sponges, Hut Point, etc.

Female : Epimeres of the third pleon segment with straight hind and lower margins, forming a rounded subrectangular posterior angle. Ocular lobe not very prominent, subrectangular. *Eye* round, colourless in spirit.

* There can be little doubt that Dr. Della Valle is right in holding that *Probolium polyprion*, Costa, was a true *Stenothoë*. The very nearly allied *Stenothoe gallensis*, A. O. Walker, certainly is so, the mandibles having no palp and the lobes of the maxillipeds being separate. In *Proboloides antarcticus* the expansion inwards and distal prolongation of the joint which corresponds to the outer lobe of the maxilliped are sufficiently developed to form a rudimentary lobe. A similar form is shown by Stebbing in his figures of *Metopa* on Pls. XL. to XLVI., and as all these species have mandibular palps, and the inner or basal lobes of the maxillipeds distinct, they should now be included in *Proboloides*, Della Valle, with the exception of *M. ovata*, which, from its two-jointed mandibular palp, might be referred to *Proboliella* but for the narrow first joints of the peræopods.

Antennæ subequal, as in *P. (Probolium) gregarium* (G. O. Sars) ; no appendage.

Mouth organs as in *P. gregarium*.

Maxillipeds with the inner lobes very small and separate, the outer (masticatory) represented by a dilation and distal prolongation of the inner margin of the joint.

First gnathopods : Wrist subequal in length to, but wider than, the hand ; the hind margins of both convex and setose, otherwise as in *P. gregarium*.

Second gnathopods : Side-plates with the front and lower margins forming a continuous curve, hind margins almost straight. First joint as long as the next four ; third joint rather acutely produced behind ; wrist with a rounded process ; margins of the hand subparallel ; hind margin subequal to the palm, which is defined by a small tooth and two spines.

First and second peræopods resembling those of *P. gregarium*, the second being stouter and more spinous than the first, but the side-plates are more rounded in front.

Third peræopods : The posterior lobe of the side-plate is suboval and considerably produced downwards. The concave hind margin of the narrow first joint is prolonged almost to the end of the second, terminating in a divided lobe.

Remaining *peræopods* as in *P. gregarium*.

The second uropods are subequal in extent to the third, the peduncle subequal to the inner ramus, which is almost twice as long as the outer ; this has two spines, the inner and peduncle several.

Third uropods : The peduncle is shorter than the ramus and has five spines ; the first joint of the ramus is subequal to the second and has three spines.

The *telson* reaches the end of the peduncle of the third uropods and has three spines on each margin.

Length, 3.5 mm.

The male is considerably larger than the female. Upper antennæ reaching to the middle of the flagellum of the lower. Peduncle of the lower twice as wide as that of the upper, the second joint as long as the flagellum, which is 12-jointed, the first joint as long as the next three.

First gnathopods : Wrist considerably longer and but slightly wider than the hand.

Second gnathopods : Side-plates rounded in front, hind margin concave, the posterior part of the lower margin irregularly serrate. First joint rather longer than the next three ; second with a prominence on the front ; wrist produced behind. Hand as long as the three preceding joints, subtriangular, hind margin shorter than the front and ending in a sharp tooth ; palm deeply excavate, with a central tooth and a denticulate ridge near the base of the dactylus.

In a younger male the palm is less deeply excavate, the central tooth wider, blunter, and denticulate, and the ridge as wide as the excavation.

Associated with this species were two or three females characterized by the concave lower margins of the side-plates of the second peræopods.

There are other slight differences, such as the greater relative width of the first joint of the upper antennæ; more slender gnathopods; the third joints of the fourth and fifth peræopods more acutely produced, etc. It is possible that it might prove to be a distinct species if the males were known.

PROBOLIELLA.

Proboliella, A. O. Walker, Ann. and Mag. Nat. Hist. XVIII. (1906), p. 13.

Mandibles with a two-jointed palp.

First maxillæ with a two-jointed palp.

Maxillipeds with the inner plates divided to the base; the outer more or less developed.

Second peræopods not stronger than the first; *third peræopods* with a narrow first joint; *fourth* and *fifth* with an expanded first joint.

P. TYPICA. (Pl. 6, fig. 10.)

P. typica, A. O. Walker, Ann. and Mag. Nat. Hist. XVIII. (1906) p. 14.

1907.6.6.238-240 W.Q., Hut Point, 11 Nov., 1902, one; 13 Oct., 1902, one; 18 Feb., 1904, one. ✓
All females.

Female—

Body tumid. Posterior angle of the third pleon segment produced and rounded.

Eye small, round, colourless in spirit.

Upper antennæ without an appendage, reaching to the middle of the flagellum of the lower; the third joint half as long as the second; flagellum seven-jointed, as long as the two last joints of the peduncle.

Mandibles bent downwards from the base of the palp and narrowed towards the coarsely toothed cutting edge; the palp more than half the length of the mandible; the first joint less than one-fourth as long as the second.

Maxillipeds: Inner plates divided; outer distinct, though narrow; first and second joints of the palp subequal, the third longer.

First gnathopods: Wrist shorter and narrower than the hand; palm very oblique, about as long as the rest of the hind margin, spinulose, and defined by two or three long spines.

Second gnathopods: Side-plates oblong, convex in front, straight behind, the angles rounded with a small tooth. First joint strong, as long and more than half as wide as the hand, fringed with setæ before and behind; third joint produced behind to a very acute point, which extends a little beyond the carpal process. Hand subelliptical, the palm longer than the rest of the hind margin, convex, spinulose, and defined by a strong tooth, beyond which is a smaller tooth and a group of spines.

First peræopods: Side-plates oblong, angles rounded, margins parallel; first

joint curved, oblong, almost as long and three times as wide as the next three; third and fifth subequal, fourth rather shorter; dactylus slender, two-thirds of the length of the preceding joint.

Second peræopods: Side-plates subtriangular, front margin straight, lower and hind margins convex. The legs as in the first pair.

Third peræopods: First joint narrow, oblong, straight.

Fourth and fifth peræopods alike; first joint oval, deeper than wide, hind margin smooth.

The *uropods* are subequal in extent and sparsely spinous; the peduncle of the third pair is subequal to the first joint of the ramus, which is also subequal to the second joint.

Telson not reaching the end of the peduncle of the third uropods, narrowing rather abruptly to a point with two spines on each side before the middle and one beyond.

Length, 3 mm.

THAUMATELSON.*

Thaumateson, A. O. Walker, Ann. and Mag. Nat. Hist. XVIII. (1906), p. 15.

General characters of *Metopa*.

Palp of the first maxillæ two-jointed.

First gnathopods distinctly subchelate.

Telson large, entire, oval and set in a vertical plane on its longer edge.

T. HERDMANI. (Pl. 7, fig. 11.)

. herdmani, A. O. Walker, Ann. and Mag. Nat. Hist. XVIII. (1906), p. 15.

W.Q., Oct., 1902; 8-net, Hut Point; from Sponges. One spec. W.Q., 13 Feb., 1904; D-net, Hut Point; one.

Body as in *Metopa*: the fourth side-plate unusually large, covering the bases of the last three pairs of peræopods. The last two pleon segments with a postero-dorsal tooth. Segments of the urus coalesced.

Antennæ: subequal, longer than the head.

Upper antennæ: First joint longer than the second, which is rather shorter than the third, and has the upper margin produced; there is no appendage. Flagellum shorter than the peduncle.

Lower antennæ: Peduncle subequal to that of the upper, second and third joints subequal and together longer than the flagellum.

Maxillipeds: Inner lobes reaching half-way up the narrow outer lobes, apparently divided rather further down than in *Metopa*; outer lobes, as in *Proboloides*, a mere slight expansion of the inner margin of the basal joint, which is produced distally half the length of the next joint, which, as well as the remaining joints of the palp, is short

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and wide; the third joint expanded distally; dactylus wide at the base, the inner margin pectinate.

First gnathopods: First joint straight, subequal to the next four; second shorter than the third, which narrows distally to a rounded point; wrist triangular, about half as long as the hand, which is subquadrate, with transverse, rather convex, palm as long as the hind margin and defined by a group of spines.

Second gnathopods: First joint straight, widening distally, almost as long as the next four; third joint oblong, ending behind in a blunted acute angle; wrist produced behind a little beyond the base of the hand; this is subtriangular, nearly twice as long as the width at the palm, which is the widest part; front margin straight; distal half of hind margin slightly concave, ending in a tooth behind which is a short and a long spine defining the transverse, slightly convex and spinulose palm.

First and second peræopods: Similar; all the joints narrow. Side-plates of the first pair oblong, about twice as deep as wide, the angles rounded; those of the second broadly subtriangular, more rounded behind than in front, the lower margin slightly concave or sinuous.

Remaining peræopods resembling the first and second, the first joints narrow.

First uropods extending beyond the second, the rami subequal, shorter than the peduncle; in the second pair the upper ramus is shorter than the lower.

The single ramus of the *third uropods* is subequal to the peduncle, the first joint rather longer than the second.

Telson as described above.

Length 2.5 mm.

FAM. OEDICERIDÆ, G. O. SARS.

OEDICEROIDES NEWNESI.

Oediceros newnesi, A. O. Walker.

1907.6.6.242-247 ✓ 5 June, 1902, ^{one} ~~two~~; length of female with ova, 7 mm. W.Q., 15 June, 1902, ^{five} ~~six~~ young. Tent Island, 3 Jan., 1904, 20 fm., one.

A better mounting of the mandible than was effected with the 'Southern Cross' specimen shows that the molar tubercle is well developed, with a toothed grinding surface. It must therefore be referred to the genus *Oediceroides* Stebbing.

The mandibular palp has the second joint wider and about one-fourth longer than the third, being widest about one-third of its length from the base.

OE. CALMANI. (Pl. 6, fig. 12.)

Oe. calmani, A. O. Walker, Ann. and Mag. Nat. Hist. XVIII. (1906), p. 15.

1907.6.6.248-253 ✓ Coulman Island, 13 Jan., 1902, 100 fm., [✓] two females. Flagon Point, 23 Jan., 1902, one young. Barrier, 29 Jan., 1902, 100 fm., [✓] one.

Female: Body scarcely compressed laterally. Mesosome segments very short, subequal, the first with a transverse fold. First pleon segment about twice as long, the second shorter, the third much longer than the first; the last mesosome and first two pleon segments with a dorsal tubercle near the middle; the third pleon and first urus segments with a shallow carina; hind margin of the third pleon segment rounded. First four side-plates as deep as the segments.

Head: Rostrum shorter than the rest of the head and reaching the end of the first joint of the upper antennæ, the lower margin scarcely concave; the front sulcate, not carinate. Eyes contiguous, occupying the greater part of the rostrum, varying from red to brown.

Upper antennæ not quite reaching the end of the second joint of the lower; the first joint rather longer and twice as wide as the second, widening distally; the second twice as long as the third; first and second with tufts of plumose setæ. Flagellum ten-jointed, shorter than the peduncle.

Lower antennæ: First joint wider than long, setose; second stout, longer than the third, which has a long spine near the middle and another at the distal end, both on the lower margin.

Mandibles: Primary cutting edge with two short blunt teeth, secondary with a long and a short tooth, molar tubercle bicuspidate; first joint of the palp very short and obconical; second subequal to the third in length, but more than twice as wide near the base, both joints with long spine-like setæ on the front margin.

Third peræopods: First joint oblong-oval, the front margin somewhat produced, both margins with long setæ, on the distal half; third joint almost as wide as the first, densely setose.

Fourth peræopods: First joint ovoid, the hind margin denticulate, sparsely setose; the front margin with longer setæ which are plumose at the lower angle, otherwise as in the third pair. The dactyli in all the peræopods except the last (which are broken in all the specimens) are almost as long as the fifth joints.

The gnathopods and rest of the animal agree with *Æ. rostrata*, Stebbing, from which species this differs in the conspicuous eyes, the different form and proportions of the rostrum, mesosome segments, first joint of the upper antennæ and second joint of the mandibular palp.

Length of female 30 mm.

FAM. EPIMERIIDÆ, G. O. SARS.

EPIMERIA INERMIS. (Pl. 8, fig. 13.)

Epimeria inermis, A. O. Walker.

Jan. 22, 1902, 500 fm., two females, length 35 mm.; W.Q., 14 July, 1903, Hole 10, 107 fm., one dissected; W.Q., 2 and 4 Sept., 1903, one; W.Q., 8 Sept., 1903, one young.

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As the single specimen in the 'Southern Cross' collection was not dissected, the following additional details are given. The specimen from which they are taken was not full grown, and differs from the larger in the absence of the prominent convexity of the lower part of the fifth side-plate and of the dorsal carina, except on the third pleon segment.

Upper antennæ: First joint of the peduncle longer than the remaining two, swollen at the base on the lower margin; second nearly twice as long as the third; both have the upper margin produced and notched. Flagellum 28-jointed.

* *Lower antennæ*: Basal joint produced on the inner side beyond the first joint, the upper margin in both forming an acute tooth; second joint rather longer and thicker than the third, the upper margin of which is produced and notched.

Mandibles: The palp stout, the second joint longer than the third, otherwise the mouth organs and maxillipeds are nearly as in *E. cornigera* (Fabr.).

Gnathopods nearly resemble those of *E. cornigera*; the hand of the second pair is shorter and wider at the distal end than that of the first, and is finely denticulate at the rounded and spinous palmar angle.

Third peræopods: Side plates rhomboidal; first joint with a long tooth-like process directed downwards from the upper part of the hind margin, which terminates in a sharp tooth.

Fourth peræopods like the third, except the side plate.

Fifth peræopods: Side plates rather wider at the top than the widest part of the first joint, narrowing downwards; first joint expanded above, narrowing abruptly near the middle, whence the hind margin curves outwards and ends in a tooth.

First uropods: Rami subequal, longer than the peduncle, narrow lanceolate, fringed with short spines on both margins.

Second uropods: Inner ramus not reaching the end of the first uropods; outer less than half as long and much narrower than the inner.

Third uropods not reaching the end of the longer ramus of the second pair, broadly lanceolate, subequal, longer than the peduncle, which has a prominent tooth.

Telson reaching to the base of the rami of the third uropods, tapering considerably and notched at the tip.

Length of the specimen described, 25 mm.

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EPIMERIA MACRODONTA. (Pl. 8, fig. 14.)

Epimeria macrodonta, A. O. Walker, Ann. and Mag. Nat. Hist. XVIII. (1906), p. 16.

Jan. 22, 1902, 500 fm., three; W.Q., 4 Sept., 1903, Hole 12, one.

All the segments of mesosome and pleon, with the exception of the first two segments, of which the first is twice as long as the second, armed with lateral teeth, increasing in length backwards, with longer dorsal teeth, curved and directed upwards and backwards; those of the last mesosome and first two pleon segments the longest.

First two segments of the urus with an upright dorsal tooth, that on the first segment the longer; the third segment with a lateral carina, which is turned up in a sharp tooth. First three side plates narrow, acutely pointed below, the first straight, second and third curved; the hind margin of the fourth forms an irregular crescent with acute points; the fifth has a long acute tooth directed backwards and outwards, reaching the hind margin of the sixth segment; the sixth has a small tooth; the seventh unarmed. Posterior angles of the epimeres of the pleon segments produced and acute.

Head: Lower margin of the ocular lobe produced forward in an acute tooth. Rostrum almost horizontal, slightly decurved, and much longer than the rest of the head. Eye large, round-oval, almost filling up the ocular lobe, colourless in spirit.

Upper antennæ shorter than the lower; first joint with a subequal distal tooth on each side, reaching nearly to the distal end of the lower margin of the second joint, which is subequal to the first, and has two long subequal distal teeth on the upper side, reaching to the seventh joint of the flagellum; third joint about half as long as the second, with a small distal tooth on the lower margin. Flagellum 32-jointed, slender.

Lower antennæ: Basal joint with four or five unequal teeth; first joint very short; second and third more than twice as long, subequal, the former with a small distal tooth below. Flagellum slender, reaching in the largest specimen to the fifth segment.

Mouth organs and maxillipeds as in *E. cornigera*.

First and second gnathopods almost alike, more slender than in *E. cornigera*, and almost exactly like those of *E. parasitica*, M. Sars.

First and second peræopods: First joint subequal to but wider than the third; fourth joint about half as long as the third; fifth considerably longer than the fourth.

Third peræopods: First joint rather longer than and twice as wide as the third, the hind margin concave, with a rounded protuberance at the proximal end and a large, very sharp tooth at the distal end directed backwards; front margin concave in the middle; front margin of the second joint produced downwards in a small tooth; third joint acutely produced behind.

Fourth peræopods: Hind margin of the first joint convex in the middle, otherwise like the third pair.

Fifth peræopods: First joint wider than that of the fourth pair, the margins more convex above, but the hind one concave above the strong and sharp distal tooth; front margins of first and second joints not produced.

The *uropods* are all subequal in extent; the second pair has the outer ramus one-third shorter than the inner; in the first and third pair the outer rami are scarcely the shorter; the peduncles of the third pair have the upper margins produced behind in an acute tooth, and are about one-third of the length of the rami; these are long and narrow, lanceolate, with a few small spines on both margins.

The *telson* narrows distally, the sides are slightly convex, and the divisions formed by a notch extending to about one-third of the length are subacute.

Length 33 mm.

This species has a superficial resemblance to *Acanthozone* (Boeck.*), from which it differs in the shape of the head, and *Acanthechinus* (Stebbing), from which it differs in the head, mandibles, gnathopods, etc. Both these genera have the telson entire.

EPIMERIELLA.

Epimeriella, A. O. Walker, Ann. and Mag. Nat. Hist. XVIII. (1906), p. 17.

Body smooth, without dorsal teeth, except in the first segment of the urus.

Head with a very small rostrum.

Fifth pair of side plates small, oblong, wider than deep, without a projecting process.

Mandibles with the molar tubercle imperfectly developed.

Third and fourth pairs of peræopods much longer than the fifth.

Otherwise like *Epimeria*.

EPIMERIELLA MACRONYX.† (Pl. 9, fig. 15.)

Epimeriella macronyx, A. O. Walker, Ann. and Mag. Nat. Hist. XVIII. (1906), p. 17.

1907 6.6. 263-268 W.Q., 29 May, 1903, Hole 4, 5 fm., two; W.Q., 1 June, 1903; Hole 8, 10 fm., three; 26 Feb., 1904 (269), one. This last measured 25 mm.; the rest were young, measuring only 6 mm.

Head slightly produced in front. *Eyes* large, round, oval, prominent, colourless in spirit.

Mesosome smooth, first and third segments subequal, and much longer than the second; remaining segments increasing in length successively. First three side-plates about as deep as the segments, narrow, convex, and pointed below, fourth deeper than the others, narrowing below in a curved point, with the upper posterior angle produced under the fifth side-plate in an acute tooth; fifth, small, transverse, oblong, with rounded ends.

Pleon with an obscure dorsal *carina*; hind and lower margins of the third segment straight and forming a right angle.

First segment of the *urus* dorsally depressed in front, and with a postero-dorsal tooth.

Upper antennæ: First joint more than twice as long as, and much wider than, the second; third shorter than the second and subequal to the first joint of the flagellum, which has about twenty joints.

Lower antennæ subequal to the *upper*; first joint very short; second and third subequal, barely reaching to the end of the second joint of the upper.

Mandibles: Molar tubercle imperfectly developed; primary and secondary cutting

* Skandinavske og Arktiske Amphipoder, 1876, p. 229; also G. O. Sars.

† From the great length of the dactyli of the third and fourth peræopods.

edges dentate; spine row long, of about twenty spines; the palp, which is set on in front of the middle, is longer than the mandible; the first joint about one-third as long as the second, which is subequal to the third. One of the mandibles appears to be without a secondary cutting plate.

First maxillæ: Inner plate with about 12 plumose setæ on its inner margin.

First gnathopods: First joint stout, rather longer than the side-plate, and subequal to the wrist and hand united; these are subequal to each other, the wrist rather the wider; the hand is oval, the palm undefined, pectinate; the whole hind margin sparsely and unequally spinous. Dactylus with 5 spines on the inner margin.

Second gnathopods are like the first, except the palm, which is more transverse, and about half as long as the rest of the hind margin.

Second peræopods: Side-plates reaching below the second joint. First joint narrow, oblong, subequal to the third and fourth united; third rather longer than the fourth, and shorter than the fifth. Dactylus continuous with the fifth joint, as long as the third, and slightly curved.

Third and fourth peræopods subequal: First joint oblong, twice as long as wide; third joint half as long as the first, acutely produced behind; fourth joint subequal to, and fifth rather longer than the first. Dactylus very long, about one-fifth longer than the fifth joint, and tapering very gradually. These two pairs appear to be generally carried elevated over the back. In the largest specimen (25 mm.) the dactyli are not quite so long relatively.

Fifth peræopods are considerably shorter, and the first joint wider, than the third and fourth; hind margin of the first joint convex, obscurely serrate, and produced downwards in a rounded lobe almost to the middle of the third joint; this is much produced behind, and is a little shorter than the fourth, which is as long as the dactylus and shorter than the fifth joint.

First and second uropods: The rami longer than the peduncles, the outer shorter and narrower than the inner.

Third uropods: Rami nearly twice as long as the peduncle, subequal, the outer the narrower, with fine spines on both margins.

Telson, reaching to about one-fourth the length of the rami of the third uropods, deeply notched at the end, with a minute notch on the tip of each division.

The above description, with the exception of that of the external characters of the animal as seen without dissection, is taken from a young specimen 6 mm. long.

FAM. IPHIMEDIIDÆ, STEBBING.

IPHIMEDIA PACIFICA.

Iphimedia pacifica, Stebbing.

W.Q., 20 Feb., 1902, 20 fm., one; 14 Jan., 1903, 130 fm., one, young, about 8 mm.; 14 July, 1903, 130 fm., one, length 24 mm.; 30 Sept., 1903, one, length 20 mm.; two on 4 Sept., 1905, one, length 30 mm.

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The tooth on the first joint of the upper antennæ is much longer in the large specimens than is shown in Stebbing's figures. This is probably only a matter of age.

IPHIMEDIA ECHINATA. (Pl. 10, fig. 16.)

Iphimedia echinata, A. O. Walker, Ann. and Mag. Nat. Hist. XVIII. (1906), p. 150.

1907.6.273-282 W.Q., 24 Sept., 1902, Hut Point, [✓]one, large; 24 Aug., 1903, Hole 12, D-net, [✓]three, large, 30 mm., and about twenty-five, [✓]young; 26 Sept., 1903, Hole 12, D-net, [✓]one, about 45 mm. long and 15 mm. across the back.

First segment of the *mesosome* longer than the second; the next four segments are longer than the second and subequal; the posterior angles of the first two are almost right angles, and of the next four acute. The fifth segment has sometimes a few small teeth on the hind margin; the sixth has more, and the seventh is dorsally depressed, and is longer than any of the other segments in the middle, but greatly narrowed downwards, with the hind margin more coarsely dentate. The pleon segments have strongly dentate, dorsal carinæ, with smaller teeth on each side, and on the hind margins; the posterior angle of the second is acute and upturned, and that of the third similar, but longer, and with a much longer curved tooth above it. The first urus segment is as long as the two next united, and has a dorsal depression followed by a group of upright teeth; the second and third are smooth, except for a tooth on each side of the telson. The first three pairs of side-plates narrow downwards to a point, the second and third curved; the fourth, fifth and sixth have a strong tooth with serrate edge directed outwards. The number of teeth appears to vary considerably in different specimens.

Head: Rostrum as long as the rest of the head, acute, decurved; ocular lobes rounded; *eyes* prominent, round, colourless.

Upper antennæ: First joint with two distal teeth on the upper side; second joint with a serrate tooth reaching almost to the end of the first joint of the flagellum on the upper margin, and a short one on the lower; third joint short. In a young specimen a rudimentary appendage was seen, but in a larger (though not adult) this was only indicated by two setæ. First joint of the flagellum as long as the next three.*

Lower antennæ subequal to the upper; second and third joints subequal; the three peduncular joints have the upper margins produced; the basal joint has a prominent curved tooth on its upper side.

Mandibles, without molar tubercles, different; one, having the simple cutting edge oblique, obscurely dentate, with a tooth at the lower angle; the other having the cutting edge more strongly dentate, with a peculiar secondary apparatus in the form of a hollow chitinous cylinder with a smooth periphery. First joint of the robust palp shorter than the second, which is subequal to the third.

* In the specimen figured the antenna was curved upwards.

First maxillæ normal.

Maxillipeds as in *I. pacifica*, except the inner plates, which are oblong and almost as wide as the outer.

First gnathopods: First joint widest in the middle; wrist rather shorter than the hand, which is chelate with short spines on the immovable digit.

Second gnathopods: First joint narrow, oblong, as long as the remaining joints; wrist and hand subequal, the latter chelate with long plumose setæ on the hind margin.

First and second peræopods: First joint strong, widening distally; second as long as the fourth; third rather longer and produced behind.

Third peræopods: First joint oblong, with a median ridge and five subequal teeth on the hind margin. In young specimens the spines are fewer and less equal. The side-plates are wider than deep, with a tooth directed backwards.

Fourth peræopods: First joint rather wider than in the third pair, with fewer and more unequal teeth, and the posterior angle very acute and upturned.

Fifth peræopods: Side-plates small. First joint wider than in the fourth pair, with four unequal teeth on the hind margin, and the posterior angle still more acute and produced.

First uropods: Rami subequal, shorter than the peduncle.

Second uropods: Outer ramus two-thirds of the length of the inner which is rather shorter than the peduncle.

Third uropods: Rami wide-lanceolate and subequal, longer than the peduncle.

Telson emarginate, the outer angles reaching to the end of the peduncle of the third uropods.

The nearest ally of this fine species is *I. pulchridentata*, Stebbing, from Heard Island, from which it differs in not having the lower ends of the first three pairs of side-plates forked, and in the numerous dorsal spine-like teeth on the seventh mesosome and three pleon-segments.

I. LONGIPES. (Pl. 9, fig. 17.)

I. longipes; A. O. Walker, Ann. and Mag. Nat. Hist. XVIII. (1906), p. 151.

Coulman Island, 100 fm., 13 Jan., 1902; one, length 30 mm. (not dissected).

Mesosome wide; pleon and urus compressed. *Head*, exclusive of the rostrum, longer than the first segment; rostrum fully as long as the rest of the head, deflexed and pointed; ocular lobe rounded in front and terminating below in a strong tooth directed downwards. *Eyes* round-oval, dark, widely separated.

First segment considerably longer than the second (which is the shortest of all) and subequal to the sixth; third, fourth, and fifth shorter than the first and subequal; seventh as long as the fifth and sixth united, with two long subdorsal teeth directed backwards. The first side-plates are rather deeper than the segment, much expanded below and rounded; second and third bluntly pointed; fourth sharply pointed below,

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with the hind margin produced backwards in a spur; fifth and sixth with the hinder angles acute; seventh small and subquadrate.

The first two *pleon-segments* have two long subdorsal teeth, as in the seventh segment; the lower margin of the first is narrowed, with the posterior angle obtuse; the hind margin of the second is concave with the posterior angle acute; the third segment is smooth with the posterior epimeral angle forming a short, blunt tooth and a longer curved tooth above it.

First segment of the *urus* dorsally depressed, much longer than the remaining two united.

Upper antennæ: First joint with a strong distal tooth on the inner side reaching almost to the end of the second joint.

First gnathopods with a chelate hand.

Last three pairs of peræopods increasing in length successively, the last pair extending much beyond the ends of the uropods; hind margin of the first joints smooth, more or less concave, and ending below in a subacute tooth.

Telson reaching to the base of the peduncles of the third uropods, shorter than the width at the base, rather deeply notched.

I. HODGSONI. (Pl. 11, fig. 18.)

I. hodysoni, A. O. Walker, Ann. and Mag. Nat. Hist. XVIII. (1906), p. 152.

Coulman Island, 13 Jan., 1902, 100 fm., one.

The whole body is clothed with fine spine-like teeth directed backwards and arranged more or less in zones on the segments of the mesosome, pleon, and urus; the side-plates are also densely spinous, and appear to be a little deeper than the segments. The body is but little compressed laterally and is widest about the first and second segments of the mesosome. The *antennæ* are rather short, subequal, and directed outwards, the basal joints of the upper being a mass of branching spines. The rostrum is almost straight and about as long as the rest of the head. *Eyes* round, darkish, and far apart.

Inner plates of the *maxillipeds* folded and squarely truncate; outer broad and rounded.

The *gnathopods* resemble those of *I. obesa*, Rathke.

Length 20 mm.

The single specimen was only partially dissected.

FAM. EUSIRIDÆ, G. O. SARS.

EUSIRUS PROPINQUUS.

1907.6.6.285-304 *Eusirus propinquus*, G. O. Sars.

W.Q., etc., various dates, very abundant.

The only points of difference between this form and the type are as follows: The

first pair of side-plates are produced in front to a rounded acute angle ; the eyes are dark brown (in spirit) instead of light red ; the antennæ have longer and more slender flagella, and the telson is less deeply divided. The two last characters, however, vary with age ; thus the telson in an adult female is like that of *E. minutus* as figured by Sars, while in an immature specimen it resembles that of *E. cuspidatus*, Kr.

In the large number of specimens taken but few are adult, viz. :—

- 1 male, length 50 mm., W.Q., 25 April, 1903, Hole 8, 10 fm. ✓
- 1 female, with young, length 48 mm., W.Q., 25 Mar., 1903, Hole 8, 10 fm. ✓
- 1 female, with ova, length 48 mm., W.Q., 31 Mar., 1903, Hole 4, 6 fm. ✓
- 1 female, with ova, length 48 mm., W.Q., May, 1903, Hole 8, 10 fm. ✓

In all probability this species, like our own *Gammarellus* (*Amathilla*) *homari*, Fabr., inhabits deep water when full grown, only coming to shallow water to deposit its young, which are hatched in the brood pouch.

Mr. Hodgson writes : “ This species occurred constantly in the traps, but in small numbers. I therefore soon ceased to preserve specimens, unless I could get them in good condition, and as their length of leg rendered this difficult, occasional specimens occur in the collection from most periods of the year. As far as I recollect, the adults with ova or young were only taken in the summer or autumn.”

E. MICROPS. (Pl. 11, fig. 19.)

E. microps, A. O. Walker, Ann. and Mag. Nat. Hist. XVIII. (1906), p. 152.

W.Q., Hole 8, 10 fm., 10 May, 1903, one, length 25 mm., and 1 June, 1903, one, length 30 mm. ; Penguin Rookery, Mount Erebus, Feb., 1904, one, length 48 mm., in bad condition. ✓

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Last segment of the mesosome and first two of the pleon carinate, with a postero-dorsal tooth. Third pleon segment with the carina rounded behind, hind margin rather convex, finely crenate in adult, the posterior angle a little produced and acute with a row of five or six intramarginal spines on the lower margin in front of it.

Urus with the first segment dorsally depressed.

Side plates small, the first subquadrate, not wider below ; the next three subtriangular, the apex below ; all rather deeply and irregularly crenate on the lower margin.

Head subequal to the first segment ; ocular lobe not prominent, truncate. Eyes dark, almost round, diameter less than that of the first joint of the upper antennæ.

Upper antennæ reaching the base of the uropods ; first joint about three-fourths of the length of the second, with a distal prominence on the lower margin terminated by a very sharply pointed tooth with a spine and a few setæ behind it ; the second joint expands at the distal end, where there are two or three acute teeth ; the third is subequal to the first of the flagellum. Secondary appendage as long as, and closely adherent to, the first joint of the flagellum.

Lower antennæ about half as long as the upper, the peduncles being subequal; second and third joints subequal.

Mandibles: First and second joints of the palp together longer than the mandible and four-fifths of the length of the third joint.

First maxillæ: Inner plate with five or six setæ.

Maxillipeds as in *E. longipes*, Stebbing.

First gnathopods: First joint robust; hinder angle of the third joint acute, as well as the carpal spur, densely setose; hand much longer than wide.

Second gnathopods rather longer than the first, the front margin of the second joint produced over the third.

First and second peræopods very slender, first joint about six times as long as wide and subequal to the next two; third joint twice as long as the fourth and rather longer than the fifth; all the joints with a few plumose setæ.

Remaining peræopods increasing in length backwards; the first joint has the hind margin rather concave, ending below in a sharp tooth, except in the third pair; the third joint is two-thirds of the length of the fourth, which is about three-fourths of the fifth; all the joints spinous and clothed with long plumose setæ. Dactylus slightly curved, the point blunt with a curved tooth near it.

Second uropods: Outer ramus about half as long and wide as the inner; this is a little longer than the peduncle, subequal in extent to the third uropods and spinous on both margins.

Third uropods: Rami subequal and similar, lanceolate, rather longer than the peduncle, with spines and plumose setæ on the inner margin.

Telson reaching beyond the end of the peduncle of the third uropods, with a small notch at the tip, the terminal divisions acute.

Recognisable by the relatively small eyes and slender hirsute legs. From its nearest ally, *E. holmii*, H. J. Hansen (Dijmphna Togtet Krebsdyr, p. 42, Pl. 22), it differs in the structure of the gnathopods.

FAM. CALLIOPIIDÆ, G. O. SARS.

ORADAREA LONGIMANA.*

Oradarea longimana, A. O. Walker.

1907.6.6.308-317 Cape Adare, 9 Jan. 1902, 20 fm., nine young of various sizes, showing the gradual development of the dorsal teeth. Coulman Island, 13 Jan. 1902, 100 fm., three; W.Q., 19 Nov. 1902, Hut Point, one, length 20 mm.; 10 Jan. 1903, one; 26 Feb. 1903, one; 16 Mar. 1903, 35 fm., Hole 7, one; 30 Sept. 1903, Hole 12, one.

* Mr. Stebbing remarks on this species (Tierreich, Amphipoda Gammaridea, p. 727): "Strangely like *Lept-amphopus novæ-zelandiæ*, G. M. Thomson." It differs, however, from this species as described in Trans. N. Z. Institute, Vol. II. p. 239, *Pherusa novæ-zelandiæ*, in having only the first two pleon segments dorsally produced in one tooth, instead of the two posterior segments of the mesosome and two anterior of the pleon produced into two teeth; also in the upper antennæ having an appendage.

In the description of this species I omitted to mention that in both pairs of antennæ the second joint is produced distally on each side of the third joint in a subacute lobe or tooth.

ATYLOIDES SERRATICAUDA.

Atyloides serraticauda, Stebbing.

Cape Adare, 9 Jan. 1902, 20 fm., ^{one}✓; and 24 Feb. 1904, in Laminaria roots, 13–20 fm., several. Cape Wadsworth, 15 Jan. 1902, 8–15 fms., ^{one}✓. 1907.6.6.318-337

In addition to the difference noted in the description of the specimens taken by the 'Southern Cross' expedition at Cape Adare, viz., seven teeth instead of two on the hind margin of the third pleon segment, the following may also be mentioned:—

1. The eyes are hardly so large and vary much in depth of colour.
2. The first joint of the upper antennæ has a strong tooth at the distal end of the lower margin.

3. The side-plates of the first and second gnathopods have more teeth on the lower margins—about seven on the first and four* on the second. These, however, may be considered as merely local or age variations, and are not, in my opinion, sufficient to constitute a new species. The 'Challenger' specimens from "off Melbourne" measured $\frac{1}{4}$ inch or about 6 mm., the largest of the Cape Adare ('Southern Cross') being 15 mm.

STEBBINGIA GREGARIA.

Stebbingia gregaria, Pfeffer, *Krebse v. Sud-Georgien Die Amphipoden, Jahrbuch d. wissenschaft. Anstalten Hamburg, V. (1888), p. 110.*

W.Q., 29 Aug. 1902, Hole 12, ^{one}✓ two young specimens, length 6 mm. 1907.6.6.338

These specimens differ in several respects from *Atyloides australis* (Miers) as described by Stebbing (Chall. Rep. p. 914). The basal joints of the flagellum of the upper antennæ are longer than wide, and there is no secondary appendage, both of which points agree with Pfeffer's description, but not with Stebbing's. The outer rami of the third uropods are shorter than the inner. The telson is divided only one-third of its length, with the tips of the divisions evenly rounded. In these last two points they differ from both Stebbing's and Pfeffer's descriptions, but the specimens are too young for any reliance to be placed on them. On the whole they agree better with Pfeffer's species than Stebbing's, of the identity of which I am doubtful (*see* Chall. Rep. pp. 913, 914, and 1654).

PONTOGENEIA MAGELLANICA. (Pl. 12, fig. 20.)

Atylopsis magellanica, Stebbing.

Pontogeneia magellanica, Stebbing.

W.Q., Hut Point, 13 Sept., 1902, ^{one}✓; 23 Nov., 1902, ^{one}✓, length, 12 mm. Tent Island, 3 Jan., 1904, ^{two}✓ three. 1907.6.6.339-342

This is a similar instance to the last species of small variations which are insuffi-

* In a young specimen there are only two.

cient for the establishment of a new species. The hind margin of the third pleon segment above the upturned angle is almost straight; the whole lower margins of the first side-plates are serrate; the hand of the first gnathopods is considerably longer than the wrist, in proportion of six to four, and the divisions of the telson are smooth and rounded at the tips.

FAM. ATYLIDÆ, G. O. SARS.

ATYLUS WALKERI, Stebbing.

Atylus antarcticus, A. O. Walker.

Atylus walkeri, Stebbing.

1907.6.6.343-352 W.Q., 31 Jan., 1902, Hut Point, 3 fm., several; 18 Mar., 1902, 10 fm., four; 28 Nov., 1902, one.
Length, 15 mm.

FAM. DEXAMINIDÆ, STEBBING.

POLYCHERIA ANTARCTICA.

Dexamine antarctica, Stebbing, Ann. and Mag. Nat. Hist. XV. (1875), p. 184.

Polycheria antarctica, Stebbing.

1907.6.6.353-356 W.Q., 30 Sept., 1903, Hole 12, D net, ^{four}six; length 6 mm.

This species was described by Mr. Stebbing, in 1875, from three small specimens found in a sponge dredged up by Sir J. Ross a few miles to the E. of the 'Discovery's' Winter Quarters. The specimens were not in good condition, or, probably, full-grown, so that the description is not as satisfactory as it might otherwise have been. Mr. Stebbing informs me that he has now united his *Tritæta Kergueleni* with this species. The present specimens agree with the description of *T. Kergueleni*, except in the following features: the side-plates of the first gnathopods are subquadrate, not produced in front; the posterior angle of the third pleon segment is produced, and acute; the margins of the telson are without spines; and the inner plate of the first maxillæ has two setæ.

Polycheria tenuipes, Haswell, *P. brevicornis*, Haswell, and *P. obtusa*, Thomson, have been referred to this species. The description and figure of the second gnathopod of the first of these, and the description of the same limb in the second, are quite unlike that of *P. antarctica* (Proc. Linn. Soc. N.S.W., Vol. IV., 1880, pp. 345-6, Pl. XXII., fig. 8g.).

✧ MELPHIDIPPA MACRURA.

Melphidippa macrura, G. O. Sars.

1907.6.6.357 Jan. 27, 1902, 300 fm., one; length to end of telson 25 mm.

The specimen which, with the exception of the loss of the third uropods, was in excellent preservation and was therefore not dissected, agrees with Sars' description

* This specimen has been redetermined by Schellenberg as *m. antarctica*

except that the middle postero-dorsal tooth on the first and second pleon segments is shorter, a character of little importance.

FAM. LILLJEBORGIIDÆ, STEBBING.

LILLJEBORGIA DUBIA.

Lilljeborgia dubia, Haswell.

W.Q., 29 Aug., 1902, and 28 Nov., 1902, two specimens, both young, the largest 12 mm. 1907.6.6.358-359

FAM. PHOTIDÆ, G. O. SARS.

HAPLOCHEIRA BARBIMANA.

Haplocheira barbimana, G. M. Thomson.

Fairly abundant in W.Q., Oct. and Nov., 1902, especially at Hut Point; also at Flagon Point, 23 Jan., 1902, and W.Q., 30 Sept., 1903. 1907.6.6.360-379

The appendage of the *upper antennæ*, which was broken in the 'Challenger' specimen, is three-jointed, the first wider than, but subequal in length to, the second; the third minute, reaching almost to the end of the second joint of the flagellum. The first urus segment has two small postero-dorsal teeth; these are sometimes difficult to see, and may have escaped Mr. Stebbing's notice, as they are not mentioned in his description. No sexual differences were observed. The females taken (except two on 1 Oct., 1902, which had young in their pouches) had generally parted with their ova.

EURYSTHEUS LONGICORNIS. (Pl. 12, fig. 21.)

Gammaropsis longicornis, A. O. Walker, Ann. and Mag. Nat. Hist. XVIII. (1906), p. 153. 1907.6.6.380-389

W.Q., 29 Jan., 1902, one female; W.Q., 20 Feb., 1902, several males and females; W.Q., 19 Mar., 1902, 10 fm., one female; W.Q., 22 Mar., 1902, 10 fm., one female.

Head almost as long as the first two segments; ocular lobe not much produced, angular.

Eyes round, red in the centre.

Third pleon segment dorsally depressed behind; posterior angle rectangular. First urus segment dorsally depressed in front. First four side-plates not as deep as the segments.

Female:—

Upper antennæ, reaching to the penultimate joint of the flagellum of the lower; the first joint more than twice as thick and less than half as long as the second, which is about one-fifth longer than the third; flagellum six-jointed, the first joint almost as long as the next two; appendage one-jointed, about one-third as long as the first joint of the flagellum.

Lower antennæ: First joint stout, about one-third of the second, which is shorter than the third; flagellum subequal to the second joint of the peduncle, five-jointed. Both pairs of antennæ are sparsely setose.

Mouth organs normal; the mandibular palp reaching beyond the first joints of the antennæ. The outer plates of the maxillipeds have spine-teeth only on the distal end of the inner margin.

First gnathopods: Side-plates oblong, rounded below, deeper than wide. First joint narrow, shorter than the fourth and fifth joints united; wrist subequal in length and width to the hand, hind margin convex, flattened near the middle; hind margin of the hand evenly convex, palm spinulose. *Dactylus* slender.

Second gnathopods: Side-plates as in the first pair. First joint widening distally; wrist subtriangular, half as long as the hand, the hind margin subangular and setose; hand with the palm subequal to the rest of the hind margin, minutely crenulate, slightly convex near the base of the dactylus, then concave to the palmar angle, which is rounded, with a spine on the side. Dactylus with two or three teeth near the point.

First and second peræopods as in *E. erythrophthalmus*, but less setose.

Last three pairs of peræopods increasing in length successively, the third pair as in *G. nana*, Sars; the fourth and fifth have the hind margin of the first joint convex above and almost straight below, with the posterior angle right. The last pair do not extend beyond the uropods.

First and second uropods: Outer rami shorter than the inner and subequal to the peduncles.

Third uropods: Peduncle twice as long as the styliform rami, of which the outer is slightly the shorter. All the uropods are sparsely spinous.

Telson not reaching to the middle of the peduncle of the third uropods, roof-shaped, with a small notch and spine at the distal end; when flattened and seen from above it appears to be triangular.

Length 6 mm.

Male:—

Upper antennæ not reaching the end of the peduncle of the lower, otherwise as in the female.

Lower antennæ almost as long as the whole animal.

Second gnathopods: First joint stouter than in the female, the front margin terminated by a blunt tooth; wrist very short, hind margin a little produced, subangular, setose; hand widening distally, front margin almost straight, hind margin rather longer than the palm, rather convex, with four fascicles of setæ terminating in a strong tooth forming the palmar angle; palm almost transverse, with a strong tooth behind the palmar one and an irregularly toothed and setose space between it and the base of the dactylus, the point of which reaches to the palmar angle, but is carried over the side of the hand.

Length 6 mm.

The most noticeable character of this species is (as the name implies), the great length of the lower antennæ, especially in the male.

FAM. SEBIDÆ. NOV.

Body rather slender, subdepressed; side-plates moderately deep.

Antennæ subequal, rather short.

Mandibles with a toothed cutting edge, molar tubercle obscure, palp rather small, three-jointed.

Maxillipeds with small inner and outer plates, palp well developed.

First gnathopods chelate in the females, chelate or subchelate in the males.

Second gnathopods longer than the first, perfectly chelate.

Third uropods uniramous.

Telson entire.

The genus *Seba* has been successively allotted to "the confines of the family *Leucothoidæ* (G. O. Sars)," Stebbing, p. 783; the *Lysianassidæ*, Della Valle, p. 773*; and the *Corophidæ*, Chevreux,† p. 111. As none of these positions is satisfactory, I have thought it better to establish a new family for it. As for the genus, it appears to me extremely doubtful whether the original species (*S. innominata*, A. Costa, of Sp. Bate, Brit. Mus. Cat., p. 159), as described by him, ever existed; it was repudiated by A. Costa. I propose, therefore, to call it *Seba*, Stebbing, 1875, with *Seba saundersi*, Stebbing, as the type.

SEBA ANTARCTICA. (Pl. 13, fig. 22.)

Seba antarctica, A. O. Walker, Ann. and Mag. Nat. Hist. XVIII. (1906), p. 154.

Common in sponges at Hut Point.

The females of this species agree in the smallest detail with the very careful and accurate description of *Seba saundersi*, Stebbing, in the 'Challenger' Report, and I have very little doubt that it is identical. For reasons given elsewhere,‡ however, it is impossible, in the absence of the description of the male from the same locality as *S. saundersi* (off Cape Virgins, Patagonia), to be certain of this.

For the description of the female I refer to that of *S. saundersi* above mentioned. The males appear to be dimorphic; the commoner form is only to be distinguished by the absence of the incubatory lamellæ. In one gathering, however (W.Q., 19 Mar., 1902, 10 fm.), two male specimens, measuring respectively 7 mm. and 5 mm., occurred; the length of females with ova and small males being 4.25 mm. In addition to their larger size, these were remarkable for having the meral joints of the last three pairs of peræopods greatly expanded behind, especially in the larger of the two.

* Fauna and Flora d. Golfes v. Neapel. Gammarini, p. 773.

† Amphipodes provenant des Campagnes de l'Hirondelle (1900), p. 111.

‡ Ann. and Mag. Nat. Hist. XVII. (1906), p. 569.

1907.6.6.390-409

FAM. ISCHYROCERIDÆ, STEBBING.

HEMIJASSA.

Since the publication of *Jassa goniamera*, A. O. W., Canon A. M. Norman has pointed* out that the genus *Jassa*, Leach, was restricted by Bruzelius† to species with the upper antennæ “*flagello appendiculari destitutæ*,” or, as is the case with his type species *J. capillata* (Rathke), having only a rudimentary appendage. As *J. goniamera* has a well-developed appendage, but differs from *Ischyrocerus*, Lillj. and *Bruzeliella*, Norman, in having no secondary teeth on the outer ramus of the third uropods, it becomes necessary to establish a new genus.

HEMIJASSA GONIAMERA.

Jassa goniamera, A. O. Walker.

1907.6.6.410-415 Coulman Island, 100 fm., 13 Jan., 1902, two specimens; W.Q., Flagon Point, 10-20 fm., 17 Jan., 1903, three; and 23 Jan., 1903, two.

FAM. COLOMASTIGIDÆ, STEBBING.

COLOMASTIX PUSILLA.

Colomastix pusilla, Grube, Ausflug n. Triest, p. 137 (1861).

1907.6.6.416-418 Oct. 1902, Hut Point, D net; sponges. Two males, one young, length 4.5 mm. Differs from *C. brazieri*, Haswell, in having the first two pairs of peræopods subequal and similar to the remainder; also in the shape of the telson.

* Ann. and Mag. Nat. Hist. XVI. (1905), p. 83, note.

† Bidrag till Känn. Skand. Amphipodens Fauna, 1858.

EXPLANATION OF PLATES.

LIST OF ABBREVIATIONS USED WITH THE FIGURES.

<i>c</i> = cephalon, head.	<i>gn</i> ¹ , <i>gn</i> ² = 1st and 2nd gnathopods.
<i>ant</i> ¹ , <i>ant</i> ² = upper and lower antennæ.	<i>pp</i> ¹⁻⁵ = 1st to 5th pairs of peræopods.
<i>M</i> = mandible.	<i>up</i> ¹⁻³ = 1st to 3rd pairs of uropods.
<i>Mp</i> = mandibular palp.	<i>T</i> = telson.
<i>mx</i> ¹ , <i>mx</i> ² = 1st and 2nd maxillæ.	<i>pl</i> = pleon ; <i>pl</i> ³ = 3rd pleon segment.
<i>mxp</i> = maxillipeds.	<i>ur</i> = urus and appendages.

PLATE 1.

Fig. 1.—*Hyperia macronyx*.

Fig. 2.—*Hyperoche luetkenides*.

PLATE 2.

Fig. 4.—*Waldeckia obesa*, Chevreux.

PLATE 3.

Fig. 5.—*Aristias antarcticus*.

Fig. 6.—*Orchomene goniops*.

PLATE 4.

Fig. 3.—*Hyperiopis australis*.

Fig. 7.—*Orchomenella chelipes*.

PLATE 5.

Fig. 8.—*Podoprionides incerta*.

Fig. 9.—*Proboloides antarcticus*.

PLATE 6.

Fig. 10.—*Probolioella typica*.

Fig. 12.—*Oediceroides calmani*.

PLATE 7.

Fig. 11.—*Thaumatelson herdmani*.

PLATE 8.

Fig. 13.—*Epimeria inermis*.

Fig. 14.—*Epimeria macrodonta*.

PLATE 9.

Fig. 15.—*Epimeriella macronyx*.

Fig. 17.—*Iphimedia longipes*.

PLATE 10.

Fig. 16.—*Iphimedia echinata*.

PLATE 11.

Fig. 18.—*Iphimedia hodgsoni*.

Fig. 19.—*Eusirus microps*.

PLATE 12.

Fig. 20.—*Pontogeneia magellanica*.

Fig. 21.—*Eurystheus longicornis*.

PLATE 13.

Fig. 22.—*Seba antarctica*. The figure of the whole animal is drawn from the larger of the two males mentioned on p. 37, while *pp*⁵ ♂ is from the smaller of the two : note the difference in the third joint.



1 gn²



1 gn²

W



and



2.1

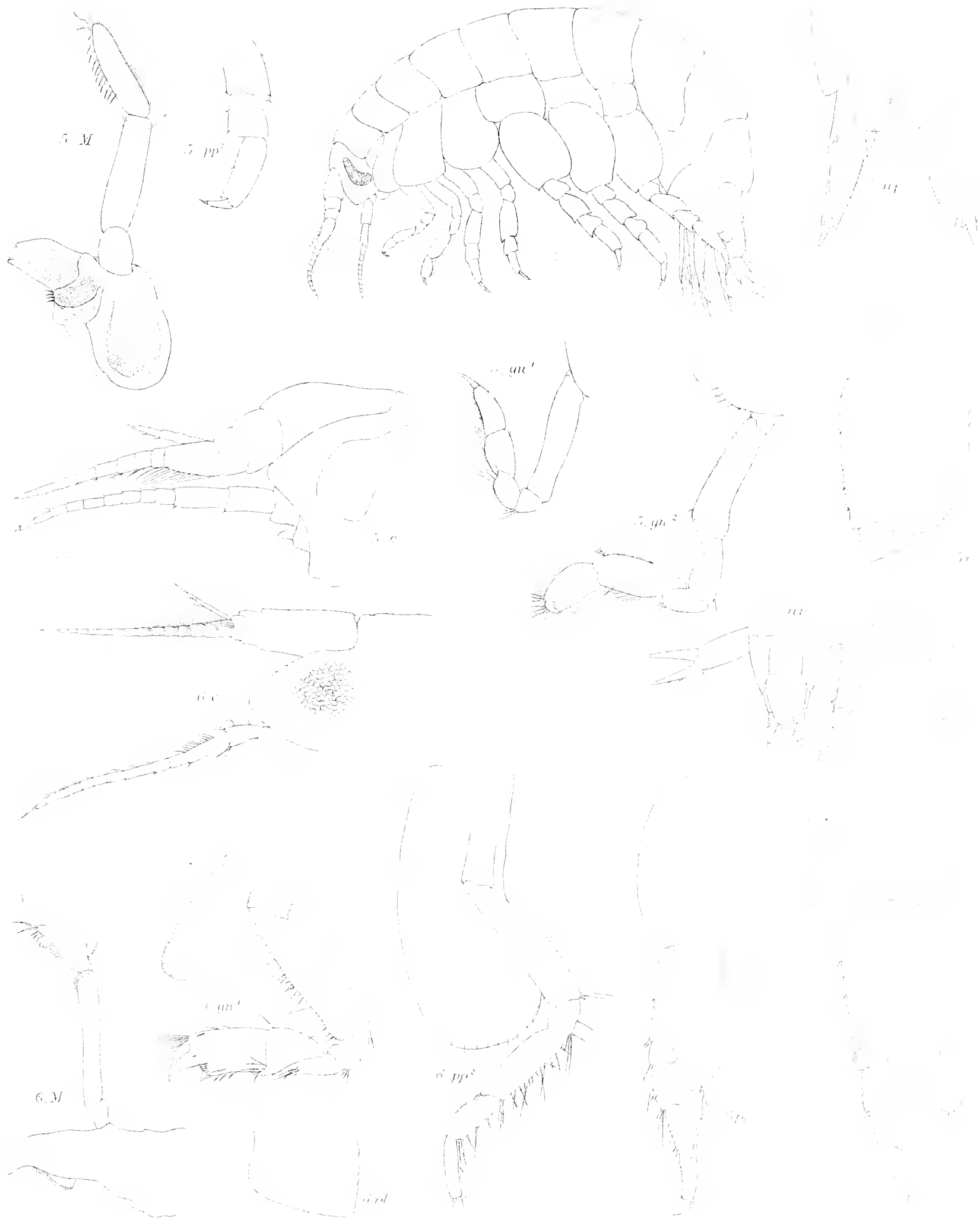
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Antarctic (Discovery) Exp.

Albion (U.S.N.S.)

4. WALDECKIA OBESA.



Antarctic (Discovery) Exp

5 ARISTIAS ANTARCTICUS

6 ORCHOMENE GONOPSIS



S ant



S ant



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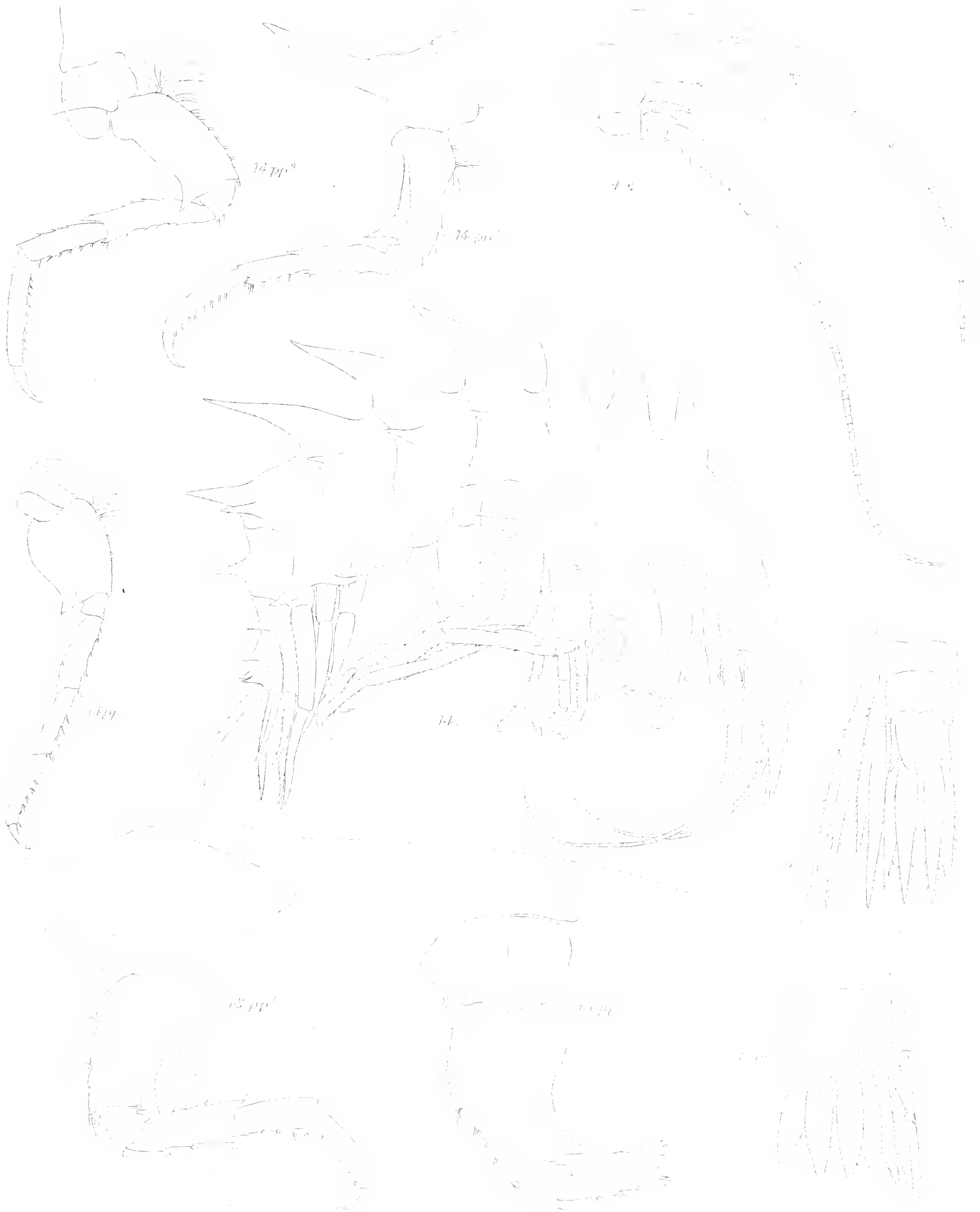
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Antarctic L. 10. 1910

10. PROBOLIELLA TYPICA

12 OEDICEROIDES CALMANI



pub

16 ant²

16 M.

16 M.

16 M.

16.

16 gn¹

16 ur.

16 gn²

16 pp⁵

16 gn²

16 gn^{2x}

16 pp²



21. gn



21. gn



21. pp



21. pp



21. pp



21. pp

20. PONTOGNEIA MAGELLANICA.

21. EURYSTREUS LONGICORNIS



Fig. 1. — 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.

CRUSTACEA.

IV.—LEPTOSTRACA.

VON DR. JOH. THIELE, BERLIN.

ZAHLREICHE Leptostraken hat die 'Discovery'-Expedition erbeutet, sie sind mir zur Untersuchung übersandt worden. Es hat sich herausgestellt, dass alle Exemplare zu einer und derselben Art gehören, und zwar zu der Form, die ich zuerst aus der Magellanstrasse erhalten habe, weshalb ich sie *Nebalia longicornis magellanica* benannte (Die Leptostraken. Wissenschaftl. Ergebnisse der Deutschen Tiefsee-Expedition auf dem Dampfer 'Valdivia,' 1898–1899, v. 8, p. 13, 1904). Die Unterart *magellanica* unterscheidet sich von der typischen *Nebalia longicornis* durch einen starken, nach vorn gerichteten Sinneshöcker über dem Auge. Dieselbe Form hat dann die Deutsche Südpolar-Expedition in ihrer Winterstation am Gaussberge gesammelt (Die Deutsche Südpolar-Expedition 1901–1903, v. 9, Heft 1, 1905) und dieselbe ist es auch, welche die 'Discovery' mitgebracht hat.

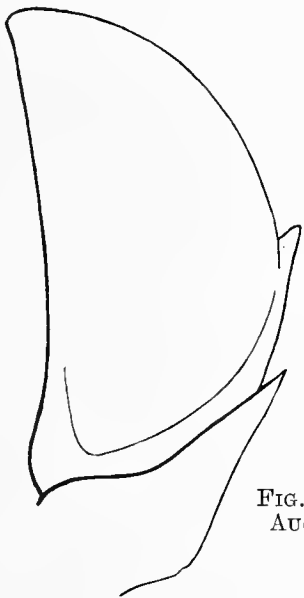


FIG. 2.—
AUGE.

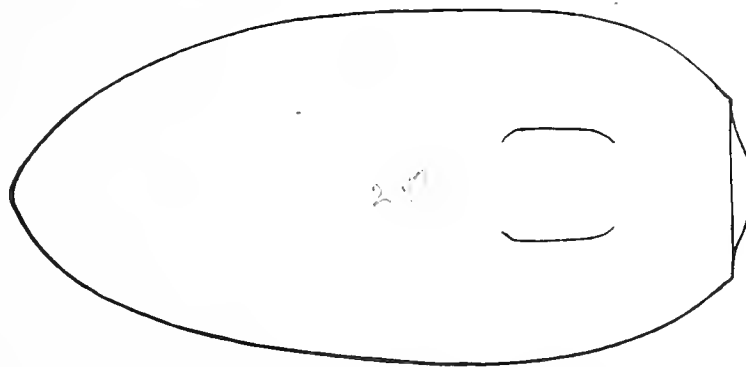


FIG. 1.—ROSTRUM, SEEN FROM BELOW.

Zu den Angaben, die ich in den beiden Publikationen über unsre Form gemacht habe, brauche ich nicht viel hinzuzufügen. Das Rostrum ist ziemlich lang, länger als ich es sonst bei *Nebalia longicornis*, die sich durch ein kürzeres Rostrum von *N. bipes* unterscheidet, gefunden habe (fig. 1); das Verhältnis der Länge zur Breite ist 2.13 : 1. Der Sinneshöcker am Auge ist mehr zugespitzt als gewöhnlich (fig. 2), das Auge nimmt den grössten Teil des Augenstiels ein. Die vordere Antenne zeigt das typische Verhalten der *Nebalia longicornis*, dass am 4^{te} Gliede nur ein Dorn vorhanden ist, dem sich am Vorderrande 8 Borsten anschliessen.

almost pyriform; the proximal long seta armed along its middle third with a double series of about twenty-five short, sharp prickles (fig. 8); in the female these are replaced by fine simple hairs (fig. 9). The secondary branch of the male antenna (fig. 11) bears a large terminal hook, the base of which is sharply bent at a right angle, and there is the usual fascicle of five long setæ; in the female (fig. 10) the secondary branch has a simple terminal joint which bears four setæ of unequal length. Spines of the caudal laminæ slender and simple (fig. 14). The shell appears simply granular in structure until after removal of the delicate lining membrane, when it is seen to be very closely and finely striated in a curvilinear fashion; there is a conspicuous group of gland-cells at the postero-ventral angle of the shell, and smaller gland-cells are continued in single file round the entire margin.

This species occurred plentifully in almost all the nettings taken in Winter Quarters. It was, indeed, by far the most abundant of all the *Ostracoda* taken during the Expedition. It has many points of resemblance to *Paraconchœcia inermis*, Claus, but cannot be identified with that species.

PARACONCHÆCIA GRACILIS.

Paraconchœcia gracilis, Claus. Die Gattungen und Arten der Mediterranen und Atlantischen Halocypriden, p. 15.

Paraconchœcia gracilis, Claus. Die Halocypriden des Atlantischen Oceans und Mittelmeeres, p. 66, Pl. xii.

In a surface gathering from lat. $49^{\circ} 40' S.$, long. $172^{\circ} 18' 30'' E.$ were found a few examples of this species. Claus saw only two specimens, a male and a female, in material taken from a depth of 1500 metres in lat. $37^{\circ} 45' N.$, long. $13^{\circ} 38' W.$

PSEUDOCONCHÆCIA SERRULATA, var. *lævis*.

1874. *Conchœcia serrulata*, Claus. Die Familie der Halocypriden, p. 61, Pl. 1, figs. 2-7, 9-11, Pl. ii. figs. 12, 13, 17, 19.

1880. *Halocypris atlantica*, Brady. Report on the Ostracoda of the 'Challenger' Expedition, p. 164, Pl. xi., figs. 1-15, Pl. xii., figs. 11, 12.

1890. *Pseudoconchœcia serrulata*, Claus. Die Gattungen und Arten der Mediterranen und Atlantischen Halocypriden, p. 20.

1891. *Pseudoconchœcia serrulata*, Claus. Die Halocypriden des Atlantischen Oceans und Mittelmeeres, p. 72, Pl. xix., figs. 1-14, Pl. xxiii., figs. 1-13.

1895. *Pseudoconchœcia serrulata*, Brady. A supplementary report on the Crustaceans of the Group Myodocopa obtained during the 'Challenger' Expedition (Trans. Zool. Soc., London, Vol. XIV., Part iii., 1897), p. 96, Pl. xvii., figs. 22-24.

This is a widely distributed species, both in the Atlantic and Pacific Oceans (Claus). It occurred plentifully in many of the Plankton collections made during the voyage of the 'Challenger,' but I do not find any distinct record of its occurrence in higher latitudes than $35^{\circ} 41' N.$ and $56^{\circ} 54' S.$ It was found in very few of the

1907.7.2
1-20

1907.7.2
21-23

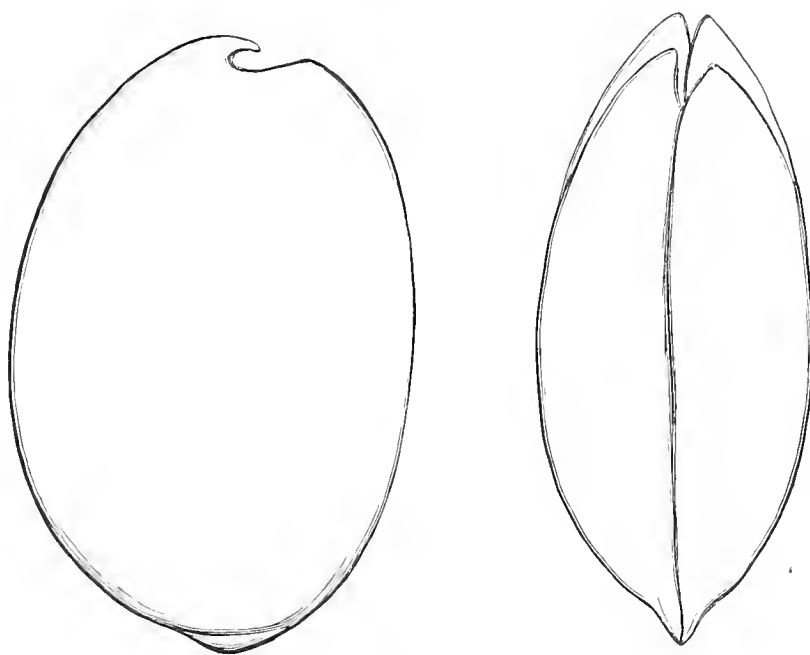
'Discovery' nettings, but in one of these it was plentiful—lat. $56^{\circ} 54'$ S., long. $170^{\circ} 28'$ E. The other stations in which it occurred less abundantly are lat. $49^{\circ} 40'$ S. long. $172^{\circ} 18' 30''$ E. (surface); lat. $59^{\circ} 19'$ S., long. $120^{\circ} 24' 30''$ E. (five fathoms); lat. $58^{\circ} 49' 45''$ S., long. $154^{\circ} 48'$ W. (five fathoms); and in Winter Quarters, No. 8 hole (ten fathoms).

1907.7.2
24-33

The 'Discovery' specimens differed in all cases from the type in being almost destitute of colour and striation of the shell, and in the absence of marginal serrulations, which are usually very distinct. But, apart from these peculiarities, I cannot find any characters to distinguish them from the type. I propose to give them the varietal name *lævis*.

CYPRIDINA GLACIALIS.

Shell, seen laterally, ovate, greatest height situated in the middle and equal to about two-thirds of the length; anterior extremity rounded off, beak short and acutely



CYPRIDINA GLACIALIS.

pointed, not at all prominent, subjacent sinus small and shallow, posterior extremity slightly produced below the middle; dorsal margin boldly and evenly arcuate, ventral much flattened; seen from above the outline is elongated, ovate, more than twice as long as broad, widest in the middle, tapering gradually toward the anterior extremity, which is subacute, posterior extremity produced and mucronate. Substance of the shell thin but calcareous, surface smooth, destitute of markings or sculpture, colour yellowish. Length, 5 mm.

One specimen only—a female—was seen in a netting consisting mainly of *Philomedes assimilis*. Winter Quarters, 11th Nov., 1902; Hut Point. Its nearest allies seem to be *Cypridina gracilis*, Brady, and, perhaps, *C. luteola*, Dana, with neither of which, however, can it be certainly identified.

1907.7.2
34

PHILOMEDES ORBICULARIS.

(Plate I., figs. 1-15.)

Shell of the *female* seen from the side almost circular, except in the region of the sinus at the ventral margin, length about one-fourth greater than the height (fig. 1); anterior extremity obtusely angulated above the rostrum, posterior broadly and evenly rounded, dorsal margin rather boldly arched throughout its whole length, ventral strongly arched from the deep subrostral sinus backwards. Seen from above (fig. 2) the outline is broadly ovate, rounded behind and submucronate in front, greatest width situated in the middle and equal to about two-thirds of the length. Surface of the shell smooth and densely clothed with a villous coating of very short hairs; margins of the rostrum and subjacent sinus fringed with stiff setæ (fig. 6). Shell of the *male* (fig. 3) somewhat elongated, height not greatly exceeding one-half of the length, rostrum and sinus less developed than in the female; posterior extremity obliquely subtruncate, slightly sinuated in the middle and rounded off ventrally; dorsal margin well arched, ventral forming a continuous flattened curve. In the young condition (figs. 4, 5), the shell of the *female* in lateral view has the postero ventral angle sharply produced and is mucronate when seen dorsally. The soft parts of the animal have the typical characters of the genus, but the antennal setæ (fig. 8) form two distinct series, the distal set being about twice as long as the proximal; the secondary branch of the female antenna (fig. 9) is two-jointed, the basal joint bearing a few short marginal setæ, the second joint four marginal setæ, one of which is longer than the rest and plumose, also a single lash-like apical seta. The secondary branch of the *male* antenna (fig. 10) is much like that of *P. brenda*, but less robust and its marginal setæ are shorter. The principal tooth of the second maxilla (figs. 12, 13) is very large and strong, somewhat hatchet-shaped, the two extremities produced into strong cutting lobes, with a third smaller lateral tooth—the appearance of the whole organ, however, varying very much according to the position in which it is seen. The other limbs present no features calling for special remark. Length, 2.5 mm.

P. orbicularis was found only in two gatherings (May 23, 1902 and June 15, 1902). It is in all respects very similar to the well-known European species *P. brenda* and may perhaps be fairly looked upon as a southern variation of that form. There is the same characteristic villous covering and the size is nearly the same, but there is a total absence, in the adult, of any posterior angulations of the shell, which is also considerably more tumid than that of the northern species. The rather well marked constriction of the anterior, and the broadly rounded character of the posterior extremity, when seen dorsally, are also noteworthy features. The form of the shell in *P. brenda* seems to be the same throughout life: at any rate the smallest specimens I have seen present characters exactly the same as those

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35-44

of the adult. But one or two small specimens which occurred along with *P. orbicularis*, and which I at first took to be the young of that species, were very distinctly angulated posteriorly, and I now think that they belong probably to the following species *P. assimilis*, especially as they have not the villous covering of *P. orbicularis*.

PHILOMEDES ASSIMILIS.

(Plate I., figs. 16-21. Plate II., figs. 1-6.)

Shell of the *female* seen from the side (Plate II., fig. 1) oblong, subcircular, height equal to two-thirds of the length, anterior extremity sharply angulated below at its junction with the wide truncated rostrum, posterior sloping steeply and forming a somewhat rounded, prominent angle at its ventral end; dorsal margin strongly arched, highest in the middle, ventral evenly but less strongly convex, terminating in front in a deep subrostral sinus and behind in an obtusely angular process. Seen from above (fig. 2) the outline is oblong, ovate, twice as long as broad, greatest width situated in the middle, anterior extremity obtusely pointed, posterior produced and mucronate, lateral margins evenly arcuate. The shell of the *male* (fig. 3) much longer in proportion to the height, rostrum and subrostral sinus much less pronounced, posterior extremity more narrowed and having a larger and more rounded ventral prominence; the squamous, marginal laminæ of the rostrum are marked with numerous hair-like striæ and are closely punctated (fig. 4). The limbs and appendages do not present any special specific characters, but the hairs at the base of the claws of the post-abdomen of the male are more than usually conspicuous (fig. 5). Length of the female, 1.8mm.

The stations at which *P. assimilis* was taken were all in Winter Quarters:—

September 30, 1903.—No. 12 hole, D. net 246.

Hut Point.—September 13, 1902, D. net.

Hut Point.—February 13, 1904, D. net 264.

10 Fathoms, March 19, 1902.

November 28, 1902, D. net.

May 23, 1902, and February 13, 1904.

12 Hole, D. net, September 8, 1903.

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PHILOMEDES ANTARCTICA.

(Plate III., figs. 1-10.)

Shell of the *female* seen from the side, broadly subovate (fig. 2), with a prominent beak, a deep subrostral sinus, and an obtusely prominent postero-ventral angle, greatest height situated in the middle, and equal to about two-thirds of the length; anterior extremity rather narrower than the posterior, sloping steeply from the dorsum to form the angularly prominent beak; posterior subtruncate, slightly sinuated, rounded off dorsally, but terminated ventrally by a rounded, backwardly produced prominence;

dorsal margin boldly and evenly rounded, ventral evenly convex but not so fully arched as the dorsal margin. Seen from above (fig. 3) the outline is ovate, scarcely twice as long as broad, widest in the middle, rounded off in front, strongly mucronate behind. The ventral border of the rostrum is produced into a thin lamina which is partly overlaid by long closely-set hairs, and the posterior border of the subrostral sinus is similarly fringed (fig. 4). Shell-surface closely and very finely punctated throughout, smooth, except on the ventral aspect, where it bears numerous scattered hairs. Just behind the rostral sinus there is a small patch of eleven or twelve subparallel striæ, and a short series of stiff hairs just within the ventral margin: a large black eye-spot just within the dorsal border at its anterior third.

The shell of the *male* (fig. 1) is larger and more elongated than that of the female, nearly twice as long as broad, with a less pronounced rostral sinus and a much narrower and more produced posterior extremity, the eye-spot small and situated near the centre.

Length of the male, 2·3 mm. ; of the female, 1·7 mm.

The setæ of the terminal fascicle of the antennule in the female are very short—not more than half the length of the limb; the second (or third?) seta of the antennæ is spinulose (fig. 8) in the female, the remaining setæ are simply ringed: the secondary branch of the antenna (fig. 6) is of the usual form, but has an indistinctly jointed appearance at the apex. Principal tooth of the second maxilla (female) (fig. 9) sharp and broadly triangular; unguis of the caudal lamina (fig. 10) rather strongly pectinate in the female—but only faintly ciliated in the male. The eyes of the male (fig. 5) are pyriform, and deeply pigmented, the frontal tentacle rigid, dilated, and slightly pigmented at the base. Secondary branch of the antenna of the male large and strongly prehensile (fig. 7), the last joint bulbously dilated at the apex, basal joint bearing a strongly uncinat process. *P. antarctica* was found rather sparingly in four of the gatherings taken at “No. 4 hole” in a depth of five fathoms.

The shell was in all cases of a thin, membranaceous character, but I suspect that this may have arisen from the solvent action of the formalin preservative on the mineral matter.

PODOCOPA.

XESTOLEBERIS RENIFORMIS.

(Plate I., figs. 4, 5.)

Shell of the *male* seen from the side (fig. 4) subreniform, much narrower in front than behind, greatest height situated behind the middle and equal to half the length; anterior extremity well rounded, narrow, posterior much wider, not very fully rounded, dorsal margin forming a continuous arch, highest behind the middle, sloping very gradually backwards and with a rather steep curve towards the front, ventral margin rather deeply sinuated in the middle. Seen from above, the outline is broadly ovate

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65-67

(fig. 5), pointed in front, broadly rounded behind, the lateral margins very boldly arcuate, greatest width situated behind the middle and equal to two-thirds of the length. The surface of the shell is smooth, deep ochreous yellow in colour, with a conspicuous dark eye-spot within the dorsal margin near the front, just below and behind which there is a large irregularly shaped pellucid, sub-circular patch, and below this again a series of four oblong muscle spots, arranged in a transverse curve, and in front of these two smaller spots the long diameters of which lie in the opposite direction. The left valve is the larger of the two, overlapping the right both in front and behind. Length 0.65 mm. The shell of the *female* is somewhat more tumid, and seen from the side has no ventral sinuosity; it is also almost free from anterior depression, the two extremities being nearly equal in width.

Two specimens only of this small species were seen, a male and a female; the female, however, was only an empty shell and was quite colourless. The exact locality of the capture I do not know. The specimens were accidentally discovered in a flocculent diatomaceous deposit which settled from the liquid in which the larger Cypridinidæ had been preserved. The flexuous lateral contour of the male distinguishes this from any other species of *Xestoleberis* known to me.

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LINOCHELES.*

Differing from the typical Cytheridæ in the greatly elongated and thread-like legs of the third pair, and in the abnormally formed copulatory plate of the male.

LINOCHELES VAGANS.

(Plate III., figs. 11-18.)

Shell closely similar in shape to *Xestoleberis*; seen laterally (fig. 11) that of the male is subreniform, greatest height situated behind the middle and equal to much more than half the length; anterior extremity narrow and obliquely rounded, posterior very wide and evenly rounded, dorsal margin boldly arched, steeply curved posteriorly, sloping with a gentle curve to the front, ventral margin sinuated in front of the middle; seen from above, the outline is elongated, ovate, widest in the middle (fig. 12), width rather less than half the length, narrowed and obtusely pointed in front, broader and rounded off behind. Shell-surface perfectly smooth; colour brown. Length, 0.64 mm.

Antennules six-jointed, very sparingly setiferous (fig. 13); antennæ short and stout, with short apical claws and a stout urticating seta which reaches to the apices of the claws (fig. 14). First and second pairs of legs (figs. 15, 16) armed with short and stout terminal claws; third pair much elongated (fig. 17), the last joint extremely slender and much longer than the united lengths of the two preceding joints; terminal

* λινον, a thread; χηλη, a claw.

claw very long, thread-like in its tenuity, nearly half as long as the entire limb; external copulative organ (fig. 18) elongated, divided into two portions, the distal part pear-shaped and attached by a narrow neck to the basal region.

Of this curious form only four specimens were found; all of them males. Three specimens from a surface netting in Lat. $49^{\circ} 40' S.$, Long. $172^{\circ} 18' 30' E.$, and one from a netting in five fathoms, Lat. $58^{\circ} 49' 45' S.$, Long. $154^{\circ} 48' W.$ It is difficult to account for the presence at the surface of an animal quite destitute of swimming organs. I am disposed to think that the real habitat is probably among floating weeds, and that the extremely long hinder limb may be useful in giving a grasp of delicate algæ or other vegetation.

EXPLANATION OF PLATES.

PLATE I.

PHILOMEDES ORBICULARIS.

- Fig. 1. Shell of female seen from left side $\times 22$.
 .. 2. " " from above $\times 22$.
 .. 3. " male seen from right side $\times 30$.
 .. 6. Beak and sinus of female seen from side $\times 84$.
 .. 7. Extremity of antennule of male $\times 84$.
 .. 8. Antenna of female $\times 50$.
 .. 9. Secondary branch of the same $\times 120$.
 .. 10. " of male $\times 120$.
 .. 11. Mandibular foot of female $\times 100$.
 (a) Process of basal joint $\times 300$.
 .. 12. Principal tooth of second maxilla seen from side $\times 240$.
 .. 13. " " " seen from front $\times 240$.
 .. 14. End of vermiform foot $\times 84$.
 .. 15. Post abdominal lamina $\times 84$.

XESTOLEBERIS RENIFORMIS.

- Fig. 4. Shell of male seen from left side $\times 84$.
 .. 5. " " from above $\times 84$.

PHILOMEDES ASSIMILIS.

- Fig. 16. End of antennule of male $\times 84$.
 .. 17. External branch of the antenna of male $\times 50$.
 .. 18. Antenna of female $\times 84$.
 .. 19. Mandibular foot of female $\times 100$.
 (a) One of the marginal setæ more highly magnified.
 Figs. 20, 21. Principal tooth of second maxilla seen laterally and obliquely $\times 240$.

PLATE II.

PHILOMEDES ASSIMILIS.

- Fig. 1. Shell of female seen from left side $\times 40$.
 .. 2. " " seen from above $\times 40$.
 .. 3. " male seen from left side $\times 40$.
 .. 4. Beak and sinus of male $\times 84$.
 .. 5. Post-abdominal lamina of male $\times 84$.
 .. 6. " " female $\times 84$.

CONCHÆCIA INNOMINATA.

- Fig. 7. Shell of male seen from left side $\times 22$.
 .. 8. Antennule and frontal tentacle of male $\times 84$.
 .. 9. " " " female $\times 84$.
 .. 10. Internal branch of antenna of female $\times 84$.
 .. 11. " " " male $\times 84$.
 .. 12. Chewing process of mandible $\times 240$.
 .. 13. Copulatory organ of male $\times 84$.
 .. 14. Post-abdominal lamina $\times 84$.

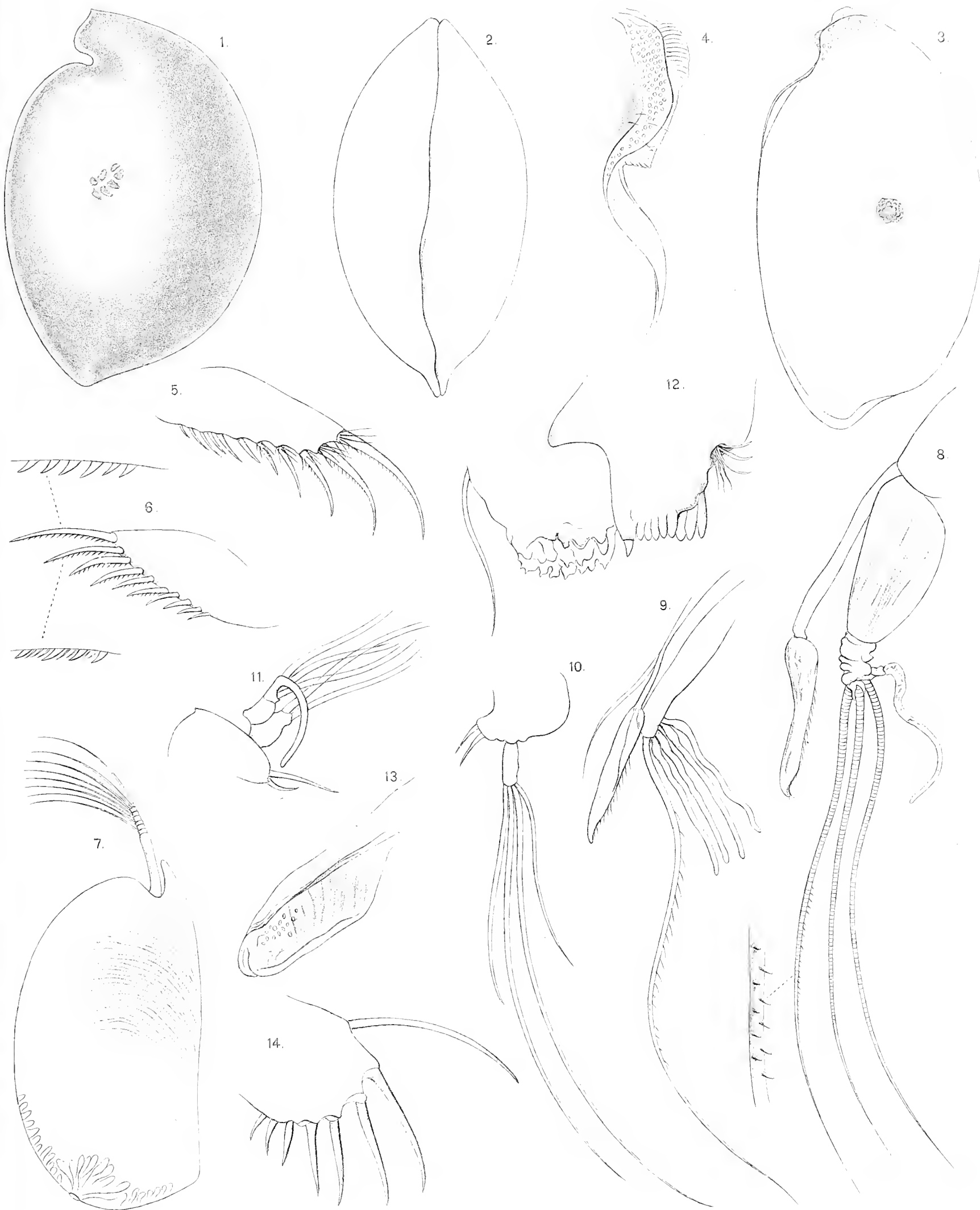
PLATE III.

PHILOMEDES ANTARCTICA.

- Fig. 1. Shell of male seen from left side $\times 30$.
 .. 2. " female seen from right side $\times 30$.
 .. 3. " " " above $\times 30$.
 .. 4. Margin of shell of female with subrostral sinus $\times 84$.
 .. 5. Eyes and frontal tentacle of male $\times 55$.
 .. 6. Secondary branch of antenna of female $\times 100$.
 .. 7. " " " male $\times 100$.
 .. 8. Portion of second seta of antenna of female with marginal spines $\times 320$.
 .. 9. Tooth of second maxilla of female $\times 84$.
 .. 10. Caudal lamina of female $\times 84$.

LINOCHÉLES VAGANS ♂.

- Fig. 11. Outline of shell seen from left side $\times 84$.
 .. 12. " " " above $\times 84$.
 .. 13. Antennule $\times 240$.
 .. 14. Antenna (apical joints) $\times 240$.
 .. 15. Foot of first pair $\times 240$.
 .. 16. " second pair $\times 240$.
 .. 17. " third pair $\times 240$.
 .. 18. Copulatory organ $\times 240$.





CRUSTACEA.
VI.—CIRRHIPÈDES.

Par A. GRUVEL,
Maître de Conférences de Zoologie (Université de Bordeaux).

(1 Plate.)

LES Cirrhipèdes du 'Discovery' qui m'avaient été envoyés dès le mois de Décembre, 1904, par le "British Museum," n'ont pu être étudiés qu'en Avril, 1906, à cause de travaux très importants et tout-à-fait différents que nous avons alors entrepris, en particulier de nos deux Missions pour l'étude des Pêcheries de la côte occidentale d'Afrique.

Bien que peu considérable par le nombre, cette collection du 'Discovery' contient une espèce d'Operculés intéressante, c'est un *Elminius rugosus* de Hutton, et deux espèces de *Scalpellum*, nouvelles pour la science : *Sc. Discoveryi* et *Sc. Bouvieri*.

Voici, du reste, la liste de ces espèces.

OPERCULATA.

HEXAMERIDÆ.

Genre *Balanus*, Da Costa.

Une seule espèce, représentée par des échantillons secs, dont les pièces operculaires ont entièrement disparu, mais qui est certainement le *Bal. psittacus*, Molina. Un individu d'assez grande taille est surtout bien caractérisé.

TETRAMERIDÆ.

Genre *Elminius*, Leach.

Ce genre est représenté par une seule espèce également. Bien que Hutton n'aie pas publié de figure pour *Elminius rugosus*, la diagnose assez complète qu'il en a donné se rapporte si exactement à celle de l'espèce que nous avons eu à examiner que nous n'hésitons pas à l'identifier. Jusqu'ici cette espèce n'a été signalée qu'en Nouvelle-Zélande, sur les rochers du Bluff, par son auteur.

Nous croyons, donc, intéressant de donner quelques figures (fig. 1-3) se rapportant à cette espèce récente, très voisine, comme le dit Hutton, de l'*Elminius plicatus* de Gray.

Localities for
this collection
recorded in
Brit. Antares.
(Terra Nova) Exp.
Nat. Hist. Rep.
III No. 4. Crustacea
pl. iii, p. 127. 1916

* Trans. N. Zealand Inst., xi., 1878, p. 328.

PEDUNCULATA.

POLYASPIDÆ.

Les deux espèces qui représentent cette famille appartiennent au genre *Scalpellum* Leach, et sont, toutes les deux, nouvelles pour la science.

Nous avons eu plaisir à dédier l'une d'elles à M. le Professeur Bouvier, du Muséum de Paris, dont l'extrême obligeance à notre égard ne s'est jamais lassée, et qui a bien voulu présenter au public scientifique notre "Monographie des Cirrhipèdes."

Quant à l'autre, nous lui donnons le nom du navire qui a servi à la belle Expédition scientifique que l'on connaît.

SCALPELLUM DISCOVERYI (fig. 4-6).

Diagnose.—Capitulum avec 14 plaques, toutes imparfaitement calcifiées et très serrées les unes contre les autres. Carène régulièrement courbe, parfois redressée assez fortement avec l'umbo à l'apex et le bord dorsal régulièrement arrondi. Terga légèrement recourbés en arrière, avec le bord occluseur courbe. Rostre bien développé, triangulaire, avec les bords latéraux à peine recouverts par les bords occluseurs des rostro-latérales. Infra-latérales avec l'apex situé vers le milieu de la plaque, légèrement rétrécie en ce point. Pas de sous-rostre. Pas de sous-carène.

Pédoncule très développé, allant en se rétrécissant, régulièrement, de la région capitulaire à la base, recouvert d'écailles allongées transversalement, disposées en séries parallèles et obliques d'avant en arrière et de haut en bas. Ces écailles sont, du reste, régulièrement disposées et non imbriquées.

Limite entre le capitulum et le pédoncule, très nette.

Pas de pénis. Pas d'appendices terminaux ou filamenteux.

Dimensions : Longueur du capitulum : 9^m ; largeur, 5^m.

„ pédoncule : 14^m ; largeur, moy. 2^m 9.

Affinités.—Par la présence de 14 plaques imparfaitement calcifiées et d'un rostre triangulaire, cette espèce vient se placer nettement à côté de *Scalpellum intermedium*, Auriv.

Observations.—Dans les deux échantillons appartenant à cette forme et que contient la collection du 'Discovery,' la calcification des plaques est assez variable. Les deux figures que nous en donnons (figs. 4 et 5) suffiraient à elles seules à montrer les différences, parfois considérables, surtout dans les scuta et les terga.

En effet, tandis que dans le premier type (le plus calcifié, fig. 4), le bord basal des terga est droit, dans le second, il forme une concavité très accentuée. Il en est un peu de même pour le bord latéral des scuta. Dans le second exemplaire, les plaques caréno-latérales sont beaucoup plus allongées et plus irrégulières de forme que dans le premier.

Du reste, dans l'ensemble, le premier individu présente un capitulum moins long et plus large que le second.

Le pédoncule offre les mêmes caractères dans les deux cas, mais il est plus court dans le second échantillon, et, comme le capitulum est plus long, il en résulte que la longueur totale est, très sensiblement, la même.

SCALPELLUM BOUVIERI (figs. 7-9).

Diagnose.—Capitulum avec 14 plaques entièrement calcifiées et, le plus souvent, serrées les unes contre les autres. Umbo de la carène très net et situé à une petite distance de l'apex. Bord dorsal de la carène aplati, sans arêtes latérales. Apex des terga légèrement recourbé en arrière, comme leur bord occluseur. Umbo des caréno-latérales situé vers le tiers de la hauteur, à partir de la base, et très légèrement saillant en arrière. Umbo des infra-latérales situé vers le milieu de la hauteur de la plaque, qui est légèrement rétrécie en ce point. Bord occluseur des rostro-latérales d'une longueur égale environ au tiers de celle du bord latéral, avec l'umbo légèrement saillant en avant.

Rostre trapézoïde, avec une carène médiane nette et les bords latéraux parfois en grande partie recouverts par les rostro-latérales.

Toutes les plaques capitulaires sont recouvertes par une euticule transparente et glabre, partout très mince, sauf sur le bord occluseur des scuta et sur tout le bord dorsal des terga et de la carène.

Pédoncule de longueur à peu près égale à celle du capitulum, orné d'écailles allongées transversalement, en séries parallèles et à peu près régulières, rapprochées vers le capitulum et s'éloignant de plus en plus du côté de la base, mais jamais imbriquées.

Pas de pénis. Appendices filamenteux uniarticulés, à peine plus longs que le protopodite de la sixième paire de cirrhes et ornés de quelques rare soies.

Affinités.—Par son aspect extérieur d'ensemble et si on ne la considérait qu'un peu superficiellement, cette espèce pourrait être assez facilement confondue avec le *Scalpellum angustum* de Prof. G. O. Sars. Mais, examinée avec soin, on voit quelle s'en distingue par plusieurs caractères, dont les deux principaux sont : la présence d'un umbo très net à la carène qui manque chez *Sc. angustum*, où cette pièce est régulièrement courbe, et enfin par la présence d'une cuticule chitineuse qui, très mince dans cette dernière espèce, est beaucoup plus épaisse chez la nôtre, spécialement sur les terga et la carène.

Par la présence de l'umbo situé près de l'apex de la carène, et par l'ensemble de ses caractères, cette espèce vient nettement se placer à côté de *Sc. aduncum*, Auriv.

Observations.—Le *Scalpellum Bouvieri* doit être très commun dans une partie des régions explorées par le 'Discovery,' car il a été retrouvé dans un grand nombre de dragages, en quantités très variables, du reste. Tous les individus que nous avons eu à examiner sont à peu près identiques à la forme moyenne que nous avons prise comme type. Presque tous sont fixés sur des Hydroïdes de diverses espèces et, parfois, en assez grand nombre, sur une même touffe.

EXPLICATION DE LA PLANCHE.

- Fig. 1.—Scutum d'*Elminius rugosus*, Hutton, vu du côté interne.
 „ 2.—Tergum du même—face interne.
 „ 3.—Scutum et tergum du même. encore unis.
 „ 4.—*Scalpellum Discoveryi*, n. sp., 1^{re} forme, la mieux calcifiée.
 „ 5.—Autre individu, moins calcifié, de la même espèce.
 „ 6.—Rostre et bords occluseurs des rostro-latérales.
 „ 7.—*Scalpellum Bouvieri*, n. sp., vu du côté droit.
 „ 8.—Le même, vu de profil et du côté ventral.
 „ 9. Rostre et bords occluseurs des rostro-latérales.

N.B.—Dans toutes les figures G = 5.

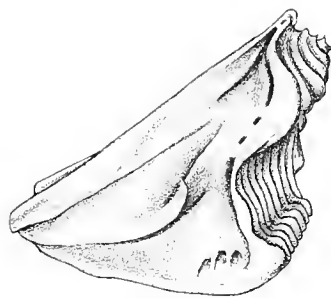


Fig. 1.



Fig. 2.

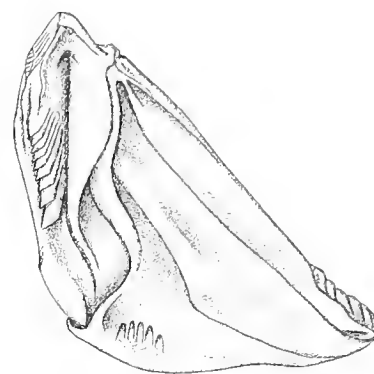


Fig. 3.



Fig. 8.

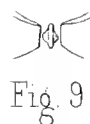


Fig. 9.

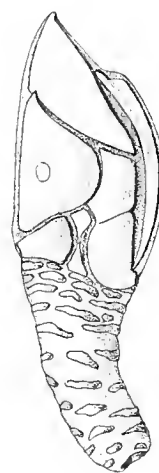


Fig. 7.

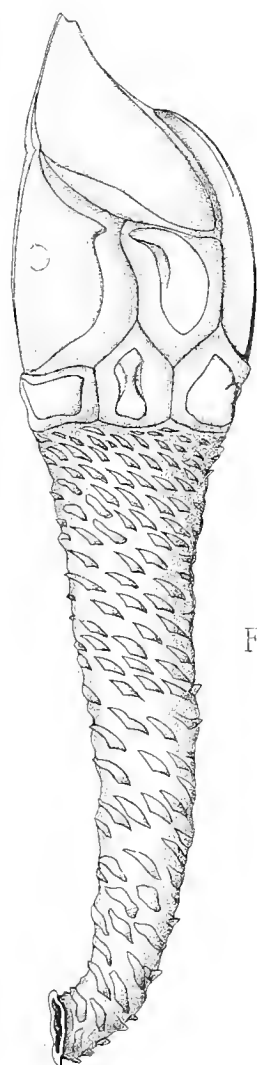


Fig. 4.



Fig. 6.

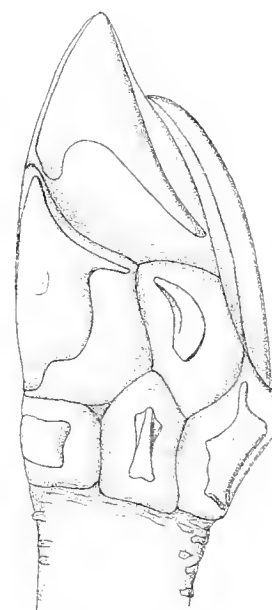


Fig. 5.

A Gruvel, ad. nat., del.

A Bénard lith

Fig. 1 à 3. *Elminius rugosus*, Hutton. - Fig. 4 à 6 *Scalpellum discoveryi*, A.G. - Fig. 7 à 9. *Sc. Bouvieri*, A.G.



CRUSTACEA.

VII.—SCHIZOPODA.

By W. M. TATTERSALL, M.Sc.

(8 Plates.)

THE collection of 'Discovery' Schizopoda is a large one from the point of view of the number of specimens it contains, considerably over ten thousand, including larvæ, having been collected. By far the majority of these specimens, nearly ten thousand, however, belong to one species, and the total number of species reaches thirteen. The collection is in a generally excellent state of preservation, though many specimens have undoubtedly suffered from being frozen after coming out of the water and from the subsequent thawing before preservation.

In the preliminary notice of this collection (Holt and Tattersall, 1906 (1)*) ten species were noted, of which five were absolutely new, two were only known under manuscript names given to them by Dr. Hansen from the collections of the 'Belgica' Antarctic Expedition, while the remaining three were already described forms.

Since the publication of that notice further material has come to hand, collected on the homeward journey of the 'Discovery.' It contained two species of *Euphausia* not included in the earlier material, one, an immature form which was too young to be specifically identified; the second, a species very close to *E. lucens*, Hansen (= *E. splendens*, G. O. Sars), but which Dr. Hansen has kindly informed me is distinct, and will be described by him in a forthcoming paper. A re-examination of the two specimens which in the preliminary note were referred to *Mysis maxima*, Hansen (MS.), has shown that they represent in reality two very closely allied species, the second of which will also be described by Dr. Hansen in a future work.

Previous to the recent activity in South Polar exploration only three expeditions to the Antarctic had brought back zoological material from which Schizopoda were recorded. Dana (1852) in his great work on Crustacea records two species from Antarctic waters (i.e., south of lat. 60° S.) viz., *Euphausia superba* and *Eucopia australis*.

H.M.S. 'Challenger' in 1874 collected, in the same region, *Euphausia superba*, *E. murrayi*, *E. antarctica*, *Thysanoëssa macrura* and a species of *Pseudomma*, doubtfully referred to *P. sarsi* by Prof. Sars, who described the Schizopoda of that expedition. The second and third species in this list are, however, only synonymous with the first, so that the real total of 'Challenger' Antarctic species is three.

* These dates refer to the list of Memoirs on p. 38.

Mr. Hodgson (1902) described two species as new, *Euphausia glacialis* and *E. australis*, collected by the 'Southern Cross' South Polar Expedition. Both species are synonymous with *E. superba*, Dana, so that previous to 1903 only four Antarctic species of Schizopoda were known, viz., *Eucopia australis*, Dana, *Euphausia superba*, Dana, *Thysanoëssa macrura*, G. O. Sars, and *Pseudomma sarsi*, Will.-Suhm.

Of the recent expeditions to the South Pole, which number seven, the results of the Schizopoda of the French Antarctic Expedition have been published in full, and of the 'Valdivia' Expedition in part only. M. Coutière (1906) notes from the French Antarctic collections, *Euphausia superba*, Dana, *E. similis*, G. O. Sars, *Thysanoëssa macrura*, G. O. Sars, and *Antarctomysis maxima* (Hansen, MS.), a species also recorded in the preliminary note on the present collection.

Preliminary descriptions have been published of two Antarctic *Mysidæ* collected by the 'Valdivia' (Illig, 1906), *Dactylerythrops arcuata* and *Echinomysis chuni*. The first of these is synonymous with a species *Dactylamblyops hodgsoni*, described below.

This completes the bibliography as regards purely Antarctic Schizopoda, though a number of sub-Antarctic species are known.

Ten of the thirteen species collected by the 'Discovery' were taken in Antarctic waters, and when, as we have seen above, the total previously recorded species number seven, it will be recognised that the present collection has added considerably to our knowledge of South Polar species of this group.

The most abundant species in the collection is a small *Euphausia*, *E. crystallorophias*, H. and T., which evidently has its head-quarters under the ice, since all the specimens were collected from ice-holes at Winter Quarters, and none were met with in the open sea. On the other hand, the dominant species of the collections from open Antarctic waters are *Euphausia superba*, Dana, and *Thysanoëssa macrura*, G. O. Sars.

The abundant material of the first-named species has afforded opportunity for some observations on the sexual characters and life history of the species, with the result that four other species, hitherto regarded as distinct from *E. superba*, must now be allocated to its synonymy, having been founded either on characters which are sexual and not specific, or else from immature specimens.

The scarcity of fully grown males of *E. superba* seems worthy of note. This fact seems to be established by the results of the various collections of which we have knowledge, since, so far as I am aware, the only one recorded is Sars' 'Challenger' specimen. M. Coutière (1906), it is true, notes that male specimens were more numerous than females in the collection he examined, but it is equally clear that none were fully grown, since the largest measured only 45 mm., and was in the stage previous to the last moult into completely grown specimens. There are no fully-grown males in the 'Discovery' collections, but to judge from the development of the copulatory apparatus on the first pleopods, many of them must be sexually mature at any rate.

Thysanoëssa macrura, G. O. Sars, too, seems never to have been previously met with in full-grown condition, and but very few of the 'Discovery' specimens can be

said to have reached that state. Still, they afford material for a re-description and figures of the species in the adult state, with some notes on the growth changes.

The Mysidacea consist of eleven specimens, referable to six species. The most interesting of these species is *Hansenomysis antarctica*, an Antarctic representative of a genus hitherto known from but three specimens from Arctic and boreal waters.

The chief interest of the collection lies in the evidence which it may afford as to the similarity or dissimilarity of the fauna at the two poles. There are no species common to the fauna of both polar regions in the collection; but, on the other hand, all the genera save one, *Antarctomysis*, are represented in northern waters by species which are quite distinct from their southern allies.

Exploration of the bottom fauna of the deep waters of the globe, especially in tropical and sub-tropical regions, is as yet only in its infancy, and it is therefore extremely probable that what are now known to be bipolar genera and species will in future be found to be cosmopolitan in their distribution. The Schizopoda were long thought to have in *Lophogaster typicus* a stock instance of a bipolar form, but the gaps in its distribution have been almost completely filled up as a result of recent deep-sea work, and, with the exception of the tropical Atlantic, its range is known to be complete from Norway to the Cape.

Two bipolar species of Mysidæ are known, however—*Boreomysis scyphops*, G. O. Sars, from Arctic waters, and Lat. 50° S., near the Crozet Islands, and *Amblyops crozetti*, from the seas of Greenland and Ian Mayen in the north and the Crozet Islands in the south. They are not known from the intermediate waters.

Of the genera of Antarctic Schizopoda, *Euphausia*, *Thysanoëssa*, and *Eucopia* are world-wide in range, but the northern and southern species are quite distinct, even the hitherto supposedly cosmopolitan *Eucopia australis*, Hansen having shown to contain at least two species, probably three.

Pseudomma, *Hansenomysis*, *Dactylamblyops*, and *Mysidetes* are, as at present known, bipolar genera, but *Pseudomma*, at least, ranges far from both poles, and further exploration will probably extend the known range of the other genera also.

The most interesting case is presented by the genus *Antarctomysis*. It is closely related in structure to the northern species *Michtheimysis mixta* (Lilljeborg), a species inhabiting chiefly the colder waters of the northern hemisphere. The two genera are separated only in the characters of the male pleopods, which are more primitive in the Antarctic form, and neither genus is likely to be found to have a distribution which extends very far from the poles they frequent.

In the preparation of this report I have received much valuable help from many sources. The authorities of the British Museum kindly allowed me to examine and dissect two specimens from the 'Challenger' collections in their charge. To Dr. Calman, of the British Museum, I have been much indebted for information on many points connected with the 'Challenger' material, and he has, also, at my request, furnished me with drawings of various species. Mr. E. W. L. Holt kindly examined

the British Museum material, and provided me with valuable notes as a result, which I have freely used in this report. The Rev. T. R. R. Stebbing, F.R.S., placed two of the type specimens of *Euphausia vallentini* at my disposal, with full permission to dissect them if found to be necessary, while Prof. D'Arey W. Thompson, C.B., allowed me to examine and retain for some time a small collection of Antarctic Schizopoda from the collections of the Museum at University College, Dundee. I am specially indebted to Dr. Hansen, of Copenhagen, for the most generous and valuable assistance. Not only did he kindly confirm or modify my determinations of the more subtle species of *Euphausia*, but he placed at my disposal his notes and drawings of the male copulatory apparatus of the species of this genus, of which he has made a special study. Without his help I should have failed to recognise that the two specimens of *Antarctomysis* belonged to two distinct species, while I should have recorded as *E. lucens* the new Antarctic species which Dr. Hansen will himself describe. For all this assistance I wish to express my best thanks.

ORDER EUPHAUSIACEA.

FAMILY EUPHAUSIIDÆ.

SUB-FAMILY EUPHAUSINÆ, Holt and Tattersall.

GENUS EUPHAUSIA, Dana.

EUPHAUSIA SUPERBA.

(Plate I., Figs. 1-12.)

Euphausia superba, Dana, 1852.

Euphausia superba, G. O. Sars, 1883 and 1885.

Euphausia murrayi, G. O. Sars, 1883 and 1885.

Euphausia antarctica, G. O. Sars, 1883 and 1885.

Euphausia glaciialis, Hodgson, 1902.

Euphausia australis, Hodgson, 1902.

Euphausia superba, Holt and Tattersall, 1906 (1).

Euphausia superba, Contière, 1906.

Localities of captures :—

1908. 9. 22. 57-86

Lat. $61^{\circ} 46'$ S., long. $141^{\circ} 12'$ E., 16. 11. 01, five specimens, 14-20 mm.

Off Scott Island, 26. 12. 01, two specimens, 15-19 mm.

Lat. $66^{\circ} 52' 9''$ S., long. $178^{\circ} 8' 15''$ E., 3. 1. 02, eight specimens, 12-16 mm.

From stomach of *Lobodon carcinophaga*, 3. 1. 02, eleven specimens, 43-47 mm.

Lat. $72^{\circ} 5'$ S., long. $172^{\circ} 23'$ E., 10. 1. 02, eleven specimens, 15-47 mm.

Lat. $72^{\circ} 10' 33''$ S., long. $172^{\circ} 26' 2''$ E., 11. 1. 02, ninety specimens, 35-48 mm.

From River Koettlitz, 2. 1. 03, sixty-nine specimens, 13-27 mm.

Lat. $70^{\circ} 29' 27''$ S., long. $168^{\circ} 51' 46''$ E., 26. 2. 04, five specimens, 45-47 mm.

None were taken at Winter Quarters from the holes dug in the ice.

The synonymy given here, whereby five supposed distinct species of *Euphausia* are merged into *E. superba*, Dana, is the result of a careful examination of the abundant and valuable 'Discovery' material, aided by a comparison with the 'Challenger' and 'Southern Cross' types (for which I am greatly indebted to Mr. E. W. L. Holt), and the small collection from the zoological museum of University College, Dundee.

Reasons for these views were briefly stated in the preliminary notice of this collection, and the opinions as to the synonymy of this species, as far as they concern *Euphausia antarctica* and *E. murrayi*, have recently been confirmed and adopted by Coutière (1906) as a result of his examination of the collection of the French Antarctic Expedition. A fuller justification for these opinions is given below, together with some notes on the growth changes, and sexual differences.

Female.—This sex has been very well described under the names *E. murrayi* by G. O. Sars (1885), and *E. australis* by Hodgson (1902).

The 'Discovery' specimens present some slight differences from Sars' description, but the examination of his type specimens proves them to be due to errors on Sars' part. They may be noted under their separate heads as follows :—

(1) *Preal anal spine*.—Sars states that this spine is wanting in *E. murrayi*, but the type specimen shows it to be distinct, well-developed and simple, but not visible from the side from which Sars took his drawing. All the 'Discovery' specimens show a well-developed simple preanal spine.

(2) *Small blunt spine on the outer distal corner of the first joint of the antennular peduncle*.—This spine is not shown in Sars' figures nor mentioned in his description. It is, however, clearly visible in the type in lateral view, but in dorsal view is quite obscured by the numerous setæ arming the basal joint of the peduncle, which are well preserved and very opaque. The 'Discovery' material conforms to the type in possessing this spine well-developed.

(3) *Terminal spine on the outer margin of the antennal scale*.—Sars mentions this spine in his description as very small, but does not figure it. It is, in fact, not visible in his type from the dorsal aspect, owing to its being slightly ventrally deflexed, and the specimen is so well preserved and rigid, that the pressure necessary to place its dorsal surface uppermost for drawing is not sufficient to straighten out the spine and render it visible in dorsal view.

(4) *Shape of the epimeral plate of the penultimate segment of the pleon*.—Sars both describes and figures the penultimate epimeral plate as acute and triangular, but in the type and the 'Discovery' material, whereas these plates have substantially the same shape as depicted by Sars, the apex in all is bluntly rounded instead of acutely pointed.

(5) *Spinules on the dorsal surface of the telson*. Sars figures and describes three pairs in *E. murrayi*, but, as a matter of fact, the number is subject to variation, an additional pair anterior to the three shown by Sars being frequently noticed. In all

other respects the 'Discovery' material and the 'Challenger' types are in perfect agreement, and the facts noted above establish the identity of the females here referred to *E. superba*, with the species described by Sars as *E. murrayi*. It now remains to show that the differences between *E. murrayi* and *E. superba* are only sexual.

Male.—Under the name *E. superba* Sars has described and figured this sex adequately. The only point in which his description is deficient is the structure and armature of the telson. He figures no dorsal spinules on the telson, and both describes and figures the apex as slightly produced and obtusely pointed. Examination of Sars' type shows that the apex of the telson is clearly broken, so that Sars' figure is in this respect entirely imaginary. In the present material the apex of the telson is much produced and acutely pointed, and the number of dorsal spinules is usually three pairs, but may be four or two, placed as in Sars' figure of the telson of *E. murrayi*. One pair of spinules still remains in Sars' type of *E. superba*, but the others had probably been broken off (or obsolete?).

The most conspicuous difference between *E. superba* and *E. murrayi*, as described by Sars, is the presence in the latter and absence in the former of a lateral denticle on the carapace. But both Sars' *E. murrayi* were females, and his single specimen of *E. superba* a male. In all the females in the present collection, the largest of which is 47 mm. in length, the spine on the lateral margin is large and prominent, and even in a female, 50 mm. in length, in the collection from University College, Dundee, the spine is equally well-developed. I have figured the spine of the latter specimen on Pl. I., Fig. 10. In male specimens, on the other hand, only those which are less than 42 mm. in length have the spine well-developed (*cf.* Pl. I., Fig. 12, taken from a male, 39 mm. in length). In males above 42 mm. up to 47 mm. in length the lateral spine on the carapace is nearly obsolete and persists only as a blunt protuberance (*cf.* Pl. I., Fig. 11, taken from a specimen 45 mm. long, and also Coutière (1906), Pl. II., Fig. 22, taken from a male of the same size). The 'Discovery' collection contains no male specimens exceeding 47 mm. in length, but the 'Challenger' type measures 48 mm. It is well preserved and shows no trace of the lateral spine at all. Obviously, then, the absence of a spine is a sexual character confined to absolutely full-grown males only. The remaining differences between *E. superba* and *E. murrayi* given by Sars are as follows:—

(1) *E. superba* has the antennules considerably more robust than in *E. murrayi* and the lobe from the second joint almost obsolete. This difference is, I think, a purely sexual one, affording a parallel instance to that seen in the northern species, *Nyctiphanes couchi*. Pl. I., Figs. 1 and 2 are taken respectively from male and female specimens of the same size, viz., 45 mm., and from the same bottle. They indicate, clearly, the difference in relative stoutness in the two sexes, and that of the male shows the lobe from the second antennular joint in an intermediate stage of reduction between that of the female and that shown by Sars in his figure of the male *E. superba*, 48 mm. in length.

(2) In *E. superba* the rostrum is shorter and blunter than in *E. murrayi*, and has the margins less deeply concave. This, again, is clearly shown to be a sexual difference in Pl. I., Figs. 1 and 2. The rostrum of the male figured (Fig. 2) is shorter than that of the female, but is still rather more acute than in Sars' figure of *E. superba*. Reduction is probably not complete till a size of at least 48 mm. is attained.

A further difference between the two sexes is brought out by the figures here given, namely, the reduction in the male of the spine on the outer distal corner of the basal joint of the antennular peduncle. It is not visible in dorsal view, being hidden by the slightly projecting anterior margin of the joint, but it still persists as a small blunt protuberance. In the female, on the contrary, it is well-developed, distinctly visible in dorsal view, and acutely pointed throughout life.

A fourth distinction shown in the figures, the absence in the female of the curved setæ on the dorsal surface of the basal joint of the antennules, is due to the accident that in the female from which the figure was taken, these setæ had become broken off. They are, in reality, present, and equally developed in both sexes.

The above detailed description proves, I think, clearly, that *E. superba* and *E. murrayi* are the adult male and female, respectively, of one species which must bear the name *E. superba* Dana.

I also give (Plate I., Figs. 5-9), figures of the mouth organs and endopods of the first two thoracic limbs, to show two characters in which *E. superba* differs from all other *Euphausia* yet described. The first of these points is the narrow and elongate form of the terminal joint of the mandibular palp, with its peculiar armature of four or five terminal strong plumose setæ. In all the other species of the genus (with the exception of *E. antarctica*, Sars, and *E. glacialis*, Hodgson), the terminal joint of the mandibular palp is much shorter and stouter. In the two exceptions just mentioned the mandibular palp is figured by Sars and Hodgson respectively, almost exactly as here given for *E. superba*. This fact first suggested to me that these two species were only developmental stages of *E. superba*, a suggestion fully borne out by the evidence derived from a study of the present collection. The second distinctive character of the appendages is found in the great length of the setæ arming the joints of the thoracic limbs. They are very much longer than in any other species of the genus, and with the character of the mandibular palp serve for recognition of *E. superba* at any stage in its development.

Euphausia superba is the giant of the genus, and the only one of Dana's original four species which is now retained by Hansen (1905 (2)), the other three having been cancelled by that author as unrecognisable.

Some Notes on the development of E. superba.

These notes were made chiefly with a view to confirming the suspicion, aroused by the similarity in mouth organs, that *Euphausia antarctica* and *E. glacialis* were merely developmental stages of *E. superba*. The changes which accompany growth to

maturity concern chiefly the rostrum and the antennules, and these notes refer to these organs more particularly.

The smallest recognisable specimen of *E. superba* measured 12·5 mm. in length. The anterior end is represented in Plate I., Fig. 4. The rostrum is a bluntly rounded triangular plate. The spine on the outer distal corner of the basal joint of the antennule is still larval in character, being much longer than in larger specimens. There is no trace of the lobe from the basal joint of the antennule, but the one from the second joint already shows as a slight membranous projection of the anterior margin. The antennal scale also shows larval characters in that the outer margin is shorter than the inner. Finally, the telson has assumed adult form, but the dorsal spinules immediately anterior to the sub-apical spines are still long and plumose. The lateral spine of the carapace is present, but small. Between 12·5 mm. and 15 mm. the spine on the basal joint of the antennule gradually shortens up and assumes the characters seen throughout adult life. The antennal scale also assumes adult form, and the spinules immediately anterior to the sub-apical spines on the telson lose their plumose character and shorten to adult size. The rostrum, however, still remains obtusely rounded.

The next stage is that described by Sars as *E. antarctica*, and measures 17 mm. The rostrum has now become a broad, acutely pointed triangular plate, while the lobe from the basal joint of the antennules first becomes evident as a slight inflation of the anterior margin. This is shown by Sars in his 'Challenger' Report (Plate XV., Fig. 2). He has, however, overlooked the lobe on the second joint of the antennules, which is now considerably forward in development. The spine on the lateral edge of the carapace is now quite conspicuous.

Sars describes *E. antarctica* as being without lateral denticles. Examination of his type specimen, however, shows that, while the side from which he took his figure is rather damaged and the spine not visible, on the other side the spine is quite conspicuous and perfect. This removes the only serious difference which existed between the young *E. superba* here noted and Sars' description of *E. antarctica*.

The transition from *E. antarctica* at 17 mm. to *E. glacialis*, Hodgson, is simple and obvious. I figure (Plate I., Fig. 3) the anterior end of a typical *glacialis* stage from a specimen 26 mm. in length. The only differences to be noted from the *antarctica* stage are the better development of the antennular lobes and the shortening and broadening of the rostrum, which is still, however, pointed at the apex. The stage figured agrees well with Hodgson's figures and description of *E. glacialis*.

After a length of about 27 mm. the sides of the rostrum gradually become more and more concave till at about 30 mm. the completely adult form is reached. Very little change takes place in either the form of the rostrum or the antennular lobes after a length of 35 mm. has been attained, except, of course, in the changes accompanying the last two or three moults in the male, already noted above. Examination of the

mouth organs at various stages confirms the identification of the specimens with *E. superba*.

This brief *résumé* of the development, I think, justifies the view that *E. antarctica* and *E. glacialis* represent stages in the development of *E. superba*, and must therefore be regarded as synonymous with that species.

It should be mentioned that Hodgson's types of *E. australis* differ in no way from *E. superba* (females), except in being considerably damaged.

EUPHAUSIA CRYSTALLOROPHIAS.

(Plate II., Figs. 1-10 ; Plate IV., Fig. 10.)

Euphausia crystallorophias, Holt and Tattersall, 1906 (1).

Localities of Captures :—

Winter Quarters.

26. 1. 02-8. 3. 02, 1 specimen, 24 mm.

„ „ 216 specimens, larval.

No. 3 Hole, 52 specimens, larval to 25 mm.

No. 4 Hole, 4572 specimens, larval to 32 mm.

No. 6 Hole, 13 specimens, larval to 25 mm.

No. 8 Hole, 4642 specimens, larval to 32 mm.

No. 13 Hole, 50 specimens, larval.

{ 1908.9.22.1-50
1947.11.20 101-202

No specimens were captured either on the outward or homeward journey.

Form, moderately robust.

Carapace (Plate II., Figs. 1 and 2), with a prominent, rather long and acute spine on its lateral margins, a little anterior to the middle, and just above the insertion of the second thoracic limb; antero-lateral angles terminating in an acute spine; anterior margins inflated above the eyestalks and produced into a long acute rostrum extending to the visual part of the eye and about half-way along the basal joint of the antennular peduncle; there is a faint gastro-hepatic groove and a distinct keel runs forward medio-dorsally from the latter into the rostrum.

Pleon (Plate II., Fig. 1) without ridges or dorsal spines; none of the epimeral plates much produced; sixth segment about one and a half times as long as the fifth; preanal spine well developed and usually simple, but in large examples bifid.

Eyes (Plate II., Fig. 1) globose and rather large; greatest diameter of the cornea exceeding half the length of the last pleon segment; pigment black.

Antennular peduncle (Plate II., Fig. 2), with the basal joint as long as the second and third joints combined and much wider; no lobe or lappet; a row of about twelve long curved plumose setæ set on a ridge on the distal part of its length; a short stout spine on the outer distal corner, which is more or less concealed by the numerous setæ which arm the outer half of the anterior margin and the distal

half of the exterior margin; a bunch of coupling setæ on the inner distal corner; second joint slightly longer than the third and without a lobe, its anterior margin a little oblique.

Antennal peduncle about equal in length to the basal two joints of the antennular peduncle, the third joint only very slightly shorter than the second.

Antennal scale reaching the centre of the third joint of the antennular peduncle, about three times as long as broad, outer margin entire and terminating in a spine, apex broadly rounded; spine on the outer corner of the basal joint long and slender, extending one-third of the way along the scale, plumose at least on the proximal part.

The mouth parts (Plate II., Figs. 3, 4, 5) are figured for comparison with those of other species. They do not appear to present any striking peculiarities.

First thoracic limb (Plate II., Fig. 6), has the penultimate joint of the endopod longer than either the preceding or ultimate joints; the latter has the lower margin armed with a row of short fine setæ in addition to the longer ones at the apex.

Second thoracic limb (Plate II., Fig. 7), with the terminal joint armed with a row of three (sometimes four) short, rather stout and curved spines on the inner face.

The remaining thoracic limbs have the penultimate joint in all cases longer than the ultimate and slightly longer than the antepenultimate. The following table gives the lengths of the joints of the first six thoracic limbs in millimetres and the total length of the limbs from a specimen 27 mm. long.

Thoracic limb.	Lengths of the joints in mm.						Total length of limb in mm.
	1	2	3	4	5	6	
1	·50	1·11	1·50	·77	1·00	·66	5·54
2	·50	1·22	1·77	1·11	1·22	·50	6·32
3	·66	1·50	1·88	1·22	1·28	·72	7·26
4	·66	1·83	2·05	1·28	1·33	·83	7·98
5	·61	2·00	2·11	1·00	1·05	·66	7·43
6	·55	2·00	2·00	·72	·83	·44	6·54

First pleopod of the male (Plate IV., Fig. 10) with both movable processes on the inner plate of the endopod shorter than the plate itself; distal process feebly curved, bifid at the tip; proximal process expanded at the tip into two lobes not in the same plane, the outer lobe the larger, and wider than long, the inner lobe but little expanded; uneinus of the inner plate of the endopod without secondary spinule.

Telson about one and a half times as long as the last segment of the pleon; apex acutely pointed; sub-apical spines extending for half their length beyond the

apex of the telson and bearing a few minute spinules on their inner margins; dorsal denticles usually in two pairs, the first about half-way towards, the second at the base of, the sub-apical spines.

Uropods reaching to the level of the insertion of the sub-apical spines, the outer very slightly longer than the inner, with a prominent denticle at its outer extremity.

Length of the largest adult specimens of both sexes, 32 mm.

Euphausia crystallorophias approaches most nearly among the species of the genus to *E. similis*, G. O. Sars, but differs (1) in the different shape of the rostral projection, (2) in the shape of the epimeral plates of the fourth and fifth segments of the pleon, (3) in the absence of antennular lobes and lappets.

From *E. splendens*, G. O. Sars (*E. lucens*, Hansen) the present species is distinguished by the greater length of the rostrum and by the absence of antennular lobes and leaflets, the types of *E. splendens*, G. O. Sars, being possessed of a small but distinct antennular lobe. *E. crystallorophias* is an enormously abundant species under the ice, some ten thousand specimens having been taken. None, however, were met with in any other locality except Winter Quarters.

Larvæ of *E. CRYSTALLOROPHIAS*.

The collection contains individuals in all stages of development from the *Metanauplius* to the adult condition.

The *Calyptopis* larvæ (Plate II., Fig. 8) first appear at the beginning of January and continue in the tow-nettings till nearly the end of February. The hood of the carapace is very obtusely pointed in front and has the margins quite smooth. There is no posterior median spine on the carapace, while the telson has the apical margin lightly emarginate. I can see the beginning of the lateral spine of the carapace at this stage. The largest *Calyptopis* larva measures 3·9 mm.

The *Furcilia* stages (Plate II., Fig. 9) first appear during the last week of February and are abundant all through March. They cease after the first week in April. The emargination of the apex of the telson is most marked during this stage and serves readily to connect it with the early *Calyptopis* larvæ. The spine on the lateral margin of the carapace is now well developed. The size of the *Furcilia* larvæ is from 4·5 mm. to 8 mm.

The *Cyrtopia* larvæ (Plate II., Fig. 10) first occur about the last week in March, and late post-larval stages are still to be had at the beginning of August. The size of this stage is from 8 to 11 mm. The rostral projection is now an acutely pointed triangular plate, but the sides are still but little concave. The final shape of the rostrum is not assumed till the animal is in all other respects like the adult.

At a size of 11 mm. the telson assumes its adult shape, but the pair of spines immediately anterior to the sub-apical spines are still long and plumose. They finally become reduced to adult size when a length of 13 mm. is reached. At this

latter size the species has all the adult characters, except perhaps the rostrum, which has the margins hardly as concave as fully adult specimens. Examples of 13 mm. in length are to be met with in January, and so were presumedly larvæ of the preceding season, from which it would appear that the species takes at least one year, and very probably longer, to reach the final adult size of 32 mm.

EUPHAUSIA TRIACANTHA.

(Plate IV., Figs. 1-3.)

Euphausia triacantha, Holt and Tattersall, 1906 (1).

Locality of capture:—Lat. $66^{\circ} 52' 09''$ S., long. $178^{\circ} 08' 15''$ E., 2030 fathoms; one specimen, immature male, 23 mm.

708. 9. 22. 87.
Carapace (Plate IV., Fig. 1), with a single lateral denticle posterior to the centre of the lower margin of the carapace; antero-lateral margins somewhat inflated over the eyestalks, and then produced into a long and very acute rostrum, which extends beyond the eyes and almost to the distal end of the basal joint of the antennular peduncle; a faint keel is present on the carapace behind the rostrum.

Pleon (Plate IV., Fig. 1) with the posterior dorsal margin of the terga of the third, fourth, and fifth segments produced into rather long, slender, very acute and slightly curved median spines; sixth segment rather long, nearly twice as long as the fifth segment without the spine.

Eyes somewhat damaged in the single specimen, but apparently rather small, pyriform in shape.

Antennular peduncle (Plate IV., Fig. 2) bearing on the inner distal corner of the basal joint a well-developed bifid leaflet, the lappets of the leaflet of about equal size; outer corner of the basal joint rounded and adorned with numerous rather long plumose setæ; a row of six curved plumose setæ on the dorsal surface of the basal joint; second joint with a simple acutely spiniform lappet arising from the median anterior margin; third joint slightly narrower and shorter than the second.

Antennal peduncle shorter than the scale, the third joint a little shorter than the second.

Antennal scale reaching very slightly beyond the distal extremity of the second joint of antennular peduncle, broadly oval in shape, about three times as long as broad, apex broadly and obtusely rounded, spine at the distal end of the outer margin small but distinct; spine on the outer distal corner of the basal joint long, slender and smooth.

First pleopods of the male (Plate IV., Fig. 3) obviously not fully metamorphosed, since both the proximal and distal movable processes on the endopod are small and simple, and the uncinus on the middle lobe is without a secondary spinule.

Telson with the portion between and posterior to the sub-apical spines acutely produced and smooth; sub-apical spines extending beyond the apex of the telson,

smooth; dorsal denticles in two pairs, the first situated at about two-thirds of the distance from the base of the telson to the insertion of the sub-apical spines, second pair just above the spines.

Uropods sub-equal in length, rather slender, extending to the level of the insertion of the sub-apical spines of the telson.

Preanal spine small and simple.

A fuller description of this species is not possible, since the single specimen is in bad condition and dissection was not desirable.

The species belongs to that group of the genus with a posterior median dorsal spine on the third segment of the pleon, and is distinguished from the other members of the group by having an equally developed spine on the fourth and fifth segments of the pleon in addition. It presents no very near kinship with any described species of the genus, and from the depth at which it was captured is probably a deep-water form.

EUPHAUSIA VALLENTINI.

(Plate IV., Figs. 4-6.)

Euphausia splendens (*pars*), G. O. Sars, 1885.

* *Euphausia vallentini*, Stebbing, 1900.

Euphausia vallentini, Holt and Tattersall, 1906 (1).

Localities of captures:—Lat. $56^{\circ} 54'$ S., long. $170^{\circ} 28'$ E., two specimens, male and female, 19 mm.

I have carefully compared these two specimens with two of the types from the Falkland Islands which the Rev. T. Stebbing kindly sent me, giving me at the same time full permission to dissect them if necessary. The 'Discovery' specimens are in perfect agreement with the types, and I have nothing to add to Stebbing's description except a note on the copulatory organs on the first pleopod of the male.

In the course of working out this collection the authorities of the British Museum kindly allowed me to examine and dissect two of the 'Challenger' specimens labelled *Euphausia splendens* by Sars. They were from the second of the localities given by Sars on p. 82 of his " 'Challenger' Report," viz., "October 21, 1875, South Pacific." It became at once apparent on examination that one of these specimens did not agree with Sars' description, since the antennule was furnished with a large evenly rounded lappet on the basal joint, very conspicuous in lateral view.* Further examination showed that it probably, indeed almost certainly, belongs to the present species. It is true that I could not see the spine on the third pleon segment, but the specimen is in very poor condition, and if, as I suspect to be the case, the spine has been broken off, the scar would be difficult to detect.

I give (Plate IV., Fig. 5) an outline sketch of the rostrum and the basal joint

* Examination of the 'Challenger' types of *E. splendens* shows that this species possesses a small antennular lobe, but it is nothing like so well developed and conspicuous as in *E. vallentini* (see Hansen (1905 (2)), Holt and Tattersall (1906 (1), and below, p. 14.)

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of the antennule of the 'Challenger' specimen and (Plate IV., Fig. 4) a sketch of the antennule of one of the 'Discovery' examples for comparison with those given by Stebbing (1900). This shows clearly, in my opinion, that all three specimens belong to one species, and that the absence of the spine on the third pleon segment of the 'Challenger' example is the result of accident or possibly an abnormality. The peculiar shape of the antennular lobe is practically the same in the 'Discovery' and 'Challenger' individuals, and only differs from Stebbing's types in degree, a result of more complete growth.

The rostrum of *E. vallentini* is very like that of *E. splendens*, G. O. Sars, but is slightly longer, and the angle formed by its margins a little more acute. Sars may have been misled by the resemblance between the rostra of the two species, which caused him to overlook the marked differences which exist in the antennulæ. Dr. Hansen has seen the 'Challenger' specimen referred to, and agrees with my interpretation of its specific identity.

One of the 'Discovery' *E. vallentini* is a male, but unfortunately the copulatory apparatus on the first pleopods is considerably damaged, so that I am obliged to refer to the 'Challenger' example, which is likewise an adult male, for a description and figure of this apparatus (Plate IV., Fig. 6). The figure represents the inner lobe of the endopodite of the first pleopod of the male. This inner lobe bears internally two movable processes, the inner and more distal of which is feebly curved, slightly over-reaching the inner lobe and bifid at the tip. The external and more proximal of the two processes has the distal extremity greatly expanded, the expansion very much broader than long, oblique, and divided into two lobes, the more distal of which is the larger. On the under side of the expansion of the proximal process as viewed in the figure there is a small spine-like process. The inner lobe of the endopodite itself bears a strongly curved uncinus with a small secondary spine near the tip.

Distribution.—Southern Pacific, between New Zealand and Chili ('Challenger'); Falkland Islands (*Stebbing*).

EUPHAUSIA, sp.

Locality of capture.—Lat. $57^{\circ} 25' 30''$ S., long. $151^{\circ} 43'$ E., nineteen specimens, 10–18 mm.

On first looking over these specimens I identified them with *Euphausia splendens*, G. O. Sars (1885), a species which Hansen (1905 (2)) considers to be different from *E. splendens*, Dana, and which he has re-named *E. lucens*. Hansen, in the same paper, notes that *E. splendens*, G. O. Sars, has the first joint of the antennular peduncle without a leaflet, but distally produced above. Holt and Tattersall (1906 (1)) have confirmed this statement by an examination of Sars' type specimens of *E. splendens*, in which they found that in the female type the lobe is quite conspicuous both in lateral and dorsal view; while in the male type, which is considerably smaller than the female, the lobe is less developed, but still easily seen in lateral view. Sars

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was therefore in error when he described the antennular peduncle of his *E. splendens* as "more particularly distinguished by the total absence of any dorsal leaflet or lobe." Moreover, it is apparent from what has already been written above in dealing with *Euphausia vallentini* that Sars confused at least two distinct species under the name *E. splendens*. It was subsequent to the publication of the preliminary notice of the 'Discovery' collection that the present specimens came to hand. I therefore appealed to Dr. Calman for further information with regard to the 'Challenger' species, and he very kindly sent me a sketch of the dorsal aspect of the anterior end of both types. From these sketches and Sars' description in the 'Challenger' report I identified the 'Discovery' specimens as *Euphausia splendens*, G. O. Sars = *E. lucens*, H. J. Hansen. Wishing, however, to have confirmation of my identification, I submitted the specimens to Dr. Hansen, who at first was inclined to agree with me that they belonged to *E. splendens*, G. O. Sars. I may, perhaps, be allowed to quote Dr. Hansen's remarks. They read as follows: "*E. lucens (splendens)*.—I have specimens from the southern Atlantic and the southern Pacific, and in all these the leaflet from first antennular joint is easily seen, triangular, but not acuminate, with the end often a little obtuse. In the material from the Swedish Antarctic expedition I have a large number of specimens which differ only from the Copenhagen specimens in the feature that the antennular leaflet is extremely small (visible as a very small triangular distally obtuse plate when seen from in front) or rudimentary, but I find it necessary to consider this difference only as a variation" (Hansen, *in litt.*). Then, after some remarks in which he noted that my specimens agree with the latter condition, he concludes by saying that he considers them to belong to the more Antarctic variety of *E. lucens*. In a later communication Dr. Hansen kindly informed me that, after an elaborate study of the copulatory organs on the first pleopods of the males of the genus *Euphausia*, he had found that these two varieties were readily distinguishable in the characters of the male pleopods, and that he proposed to consider them as two species. At the same time he was good enough to send me sketches of the first pleopods of both species for comparison with my own specimens.

The largest 'Discovery' specimen is a male 18 mm. in length, and as far as I can judge, it appears to be quite adult. The copulatory apparatus on the first pleopods agrees exactly with the sketch which Dr. Hansen sent me of the same apparatus in his Antarctic form. It would therefore appear that these specimens belong to Hansen's new Antarctic species. I have not attempted to give a detailed description with figures of this form, since it is quite evident that an accurate diagnosis can only be drawn up from a close study of this species and the true *E. lucens* side by side, and a careful comparison, character by character. There are no specimens of the true *E. lucens* in the 'Discovery' collection, so I leave the descriptions of the two species to Dr. Hansen, who has abundant material for the purpose.

I may mention here that some specimens of an *Euphausia* (labelled *E. splendens*, G. O. Sars) in the small collection of Antarctic Schizopods kindly lent me by Prof.

D'Arcy W. Thompson, from the collections of the University College, Dundee, appear to belong to this species. They were collected in the Antarctic Ocean, the exact locality being uncertain, but it is believed to be in the neighbourhood of the South Shetland Islands.

EUPHAUSIA, sp. ?, juv.

(Pl. IV., Figs. 7-9.)

Localities of captures:—Lat. $49^{\circ} 40'$ S., long. $172^{\circ} 18' 30''$ W., five specimens, immature, 8-9 mm.

Lat. $58^{\circ} 49' 45''$ S., long. $154^{\circ} 48'$ W., three specimens, immature, 10 mm.

The specimens from the above two localities all belong to the same species. They were submitted to Dr. H. J. Hansen of Copenhagen, who agreed with my suggestion that they were too young for absolute specific determination. I give here only a brief description, pointing out a few of the characteristic features.

Carapace with a prominent slender denticle on lateral margins just over the base of the third thoracic limbs; antero-lateral margins slightly undulate, only partially concealing the eyestalks and produced into a long, narrowly acute rostrum (Fig. 7) extending almost to the anterior end of the eye and about half-way along the basal joint of the antennules.

Pleon having the third segment provided dorsally on the median posterior margin of the tergum with a slender spine (Fig. 9); sixth segment long and slender, about twice as long as the fifth.

Antennular peduncle (Figs. 7 and 8), with a minute bluntly pointed simple lobe on the inner distal corner of the basal joint; a thin oblique lamella-like ridge running across the third joint from the inner proximal to the outer distal corner and partly continued down the inner side of the second joint.

Antennal scale reaching to about half-way along the terminal joint of the antennular peduncle.

Telson having the portion beyond the sub-apical spines produced into an acute apex with smooth margins; two pairs of spinules present.

Uropods reaching to the level of the insertion of the sub-apical spines.

This species belongs to that section of the genus provided with a spine on the dorsal surface of the third segment of the pleon. Among members of this section it approaches most nearly to *E. gibboides*, Ortmann (1893), but Dr. Hansen has kindly pointed out to me that it differs from that species in the much greater length of the rostrum and its different shape.

The smallest of the specimens, *i.e.* all under 9 mm. in length, have the spine on the third pleon segment still undeveloped, only the two largest ones, 9.5 mm. and 10 mm. in length, showing it fully formed. We have here slight evidence as to the stage in development at which this spine appears. None of the specimens present any larval characters in the form of the telson or antennules. It would appear, then, that

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the spine, at any rate in this species, develops late in life, only after the final adult form is reached.

The species was taken on the homeward voyage of the 'Discovery,' in the extreme southern part of the Pacific Ocean between New Zealand and Cape Horn.

SUB-FAMILY NEMATOSCELINÆ, Holt and Tattersall.

GENUS THYSANOËSSA, Brandt.

THYSANOËSSA MACRURA.

(Pl. III., Figs. 1-12).

Thysanoëssa macrura, G. O. Sars, 1883; *id.* (1885); Ortmann, 1893; Stebbing, 1900; Holt and Tattersall, 1906 (1); Contière, 1906.

Localities of captures:—

Winter Quarters.

No. 4 Hole, 47 specimens, 7-18 mm.

No. 8 Hole, 40 „ 8-21 mm.

No. 12 Hole, 2 „ 7 and 20 mm.

From River Koettlitz, 2. 1. 03, 6 specimens, 9-14 mm.

Outward or Homeward Journey.

Lat. 61° 46' S., long. 141° 12' E., 16. 11. 01, 18 specimens, 14-20 mm.

Lat. 57° 25' 30" S., long. 151° 43' E., 20. 11. 01, 35 specimens, 12-22 mm.

Lat. 54° 1' 15" S., long. 170° 49' E., 27. 12. 01, 1 specimen, 6 mm.

Lat. 61° 13' 30" S., long. 173° 33' E., 31. 12. 01, 30 specimens, 12-19 mm.

Lat. 66° 52' 9" S., long. 178° 8' 15" E., 3. 1. 02, 3 specimens, 8-9 mm.

Lat. 70° 29' 27" S., long. 168° 51' 46" E., 26. 2. 04, 1 specimen, 28 mm.

Lat. 49° 40' S., long. 172° 18' 30" W., 12. 6. 04, 2 specimens, 8-12 mm.

Lat. 58° 49' 45" S., long. 154° 48' W., 24. 6. 04, 4 specimens, 10 mm.

Lat. 59° 34' 30" S., long. 106° 28' 12" W., 28. 6. 04, 3 specimens, 7 mm.

Lat. 55° 44' S., long. 95° 43' 30" W., 1. 7. 04, 3 specimens, 6-8 mm.

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Form (Fig. 1) of the body rather slender.

Carapace (Fig. 1) with a single rather long slender spine on the lower lateral margin posterior to the middle, just above the origin of the sixth thoracic limb; antero-lateral corners acute and somewhat produced; anterior margins very concave and produced forwards into a long, slender, acute rostrum which reaches beyond the eyes and far beyond the middle of the basal joint of the antennules; there is a low keel on the anterior part of the carapace behind the rostrum, and a very faint gastro-hepatic groove.

Pleon (Fig. 1) rather elongate, narrow and attenuate; segments unarmed; sixth segment equal to or slightly less than the combined lengths of the preceding two;

preanal spine well developed, provided with an external strong tooth and a comb-like row of finer teeth up to twelve in number.

Antennular peduncle (Fig. 2) rather long and slender, considerably longer than half the carapace; basal joint rather flattened, considerably wider than the remaining two joints, bearing on its outer distal corner a rather long and slender spine, its anterior margin somewhat overlapping the basal part of the second joint, fringed with numerous setæ and exhibiting near the inner side a shallow fissure: terminal two joints very long and slender, subequal in length, their combined lengths slightly exceeding that of the basal joint.

Antennal peduncle (Fig. 3) very long and slender, nearly as long as the scale, third joint less than half as long as the second.

Antennal scale (Fig. 3) extending to about midway along the terminal joint of the antennular peduncle, almost five times as long as broad, outer margin terminating in a well-marked spine, inner margin sloping away obliquely towards the apex; spine on the basal joint moderately long, slender and smooth.

Mouth parts (Figs. 4-6) do not offer any marked differences from those of *Thysanoëssa gregaria* as figured by Sars (1885, Pl. XXII).

Second thoracic limbs (Fig. 8), with the endopod remarkably long and well developed, in full-grown specimens equalling nearly three-quarters of the total length of the body from the eyes to the telson; meral joint the longest, extending beyond the tip of the antennular peduncle; carpal joint a little shorter than the meral and more slender, nearly four times the length of the propodal joint, armed with four slender spiniform setæ on the outer margin at the distal extremity, and five similar setæ on the inner distal margin; propodal joint with five long spiniform setæ on the outer and six on the inner margin; terminal joint small, tipped with six spiniform setæ.

The remaining thoracic limbs (figs. 7, 9, 10) not differing greatly from the same limbs in *T. gregaria*.

Copulatory apparatus (Fig. 11) on the first pleopod of the male exhibits a structure very similar to that figured by Sars for *T. gregaria*, except that the distal extremities of the two movable processes on the inner lobe do not seem to be serrate.

Telson slender, apex acutely produced and smooth; sub-apical spines smooth; dorsal denticles two pairs, the first pair just anterior to the centre of the telson, the second pair a little anterior to the insertion of the sub-apical spines.

Uropods exceedingly slender, inner one reaching the apex of the telson, outer slightly shorter.

Length of the largest specimen, 28 mm.

I have thought it well to describe and re-figure this species, since Sars' original description was taken from admittedly young forms, and I cannot find that mature specimens have ever been described and figured. The changes that take place during growth affect principally the rostrum, the second thoracic (or elongate) limb and the preanal spine.

The rostrum is figured correctly by Sars from a specimen, 13 mm. in length. At that stage in development the rostrum is an acutely triangular projection, the sides of the triangle very nearly straight and but little concave. As growth proceeds, however, the sides of the triangular plate become deeply concave and the rostrum assumes the form of a long narrow acutely spiniform projection, as shown in Fig. 2. This gives it something of the form as seen in *T. gregaria*, but it is much longer and more slender than in that species.

Sars describes and figures the preanal spine in his 13 mm. specimen as armed with only two teeth. This is correctly stated for a specimen that size, but increase in size is also accompanied by an increase in the number of teeth in the preanal spine, till in a specimen 28 mm. in length I found the teeth to number twelve in addition to the strong external one. The teeth are, moreover, fine and comb-like, and the whole spine closely resembles that figured by Sars for *T. gregaria*. I have noticed all intermediate stages in the present material. This clearly undermines the value of the preanal spine as a specific character, since the number of teeth is dependent first of all upon age, while individual variation must also be taken considerably into account.

The most considerable changes due to growth are, however, exhibited by the second thoracic limbs. Sars describes them as much smaller than in *T. gregaria*, with the meral joint scarcely reaching beyond the middle of the antennal scale. But the above description and accompanying figures show that the limb is quite as well developed as in *T. gregaria*, and that the meral joint in full-grown individuals actually extends beyond the antennular peduncle. Stebbing (1900) has already called attention to the fact that in specimens of this species from the Falkland Islands the elongate limbs were proportionately longer than in Sars' drawing, but he gives no figures. I find that this statement applies generally to the material in the present collection, even in specimens of the same size as Sars'. Only two exceptions were noted, and in these two specimens the elongate limbs were proportionally as in Sars' figures. I will deal with these two exceptions and Sars' specimen below, but will proceed first to briefly note the changes which take place in these limbs during growth. In two specimens, 8 and 9 mm. in length, the second thoracic limbs are developed about as fully as in Sars' figures. They are considerably less than one-half of the total body-length of the specimens, the meral joint extends very little beyond the centre of the antennal scale, and is about equal to the terminal three joints combined, while the carpal joint is only about twice as long as the propodal.

In specimens from 13 mm. to 18 mm. in length, these limbs are about equal in length to the half of the length of the body, the meral joint extends to the tip of the antennular peduncle, and is a little shorter than the terminal three joints combined, while the carpal joint is now three times as long as the propodal. This is the condition noted by Stebbing in his Falkland Islands specimens. In the full-grown specimen, 28 mm., the elongate limbs measure 21 mm. in length, or three-quarters of

the total body-length. The meral joint extends beyond the tip of the antennular peduncle, and is about one-tenth shorter than the combined lengths of the terminal three joints, while the carpal joint is four times as long as the propodal. It will be seen, therefore, that these changes during growth are quite considerable, and most evident in the elongation of the carpus.

It was noted above that Sars' specimen, 13 mm. in length, had the elongate limbs only as well developed as in a specimen 8 mm. long. I have found in the present collection two specimens, 16 and 17 mm. long, in which these limbs were at the same stage of development. They were accompanied by specimens with more fully developed elongate limbs, and I would suggest that the comparative shortness of these legs in the above-mentioned two specimens and in Sars' type is due to their having at some earlier period been broken off and grown again. This is a common occurrence in Decapods, and I should think is by no means rare in Euphausians, especially those with elongate second legs, which must be specially liable to be detached. The re-developed limb is usually shorter than the one it replaces. I believe this explanation to be the correct one in the present instance, though it may be that we have here a case of retarded development. Further slight changes during growth are seen in the proportional length of the last pleon segment, which in very young specimens is slightly longer than the combined length of the preceding two, while in full-grown specimens the reverse is seen, though the differences either way are not great.

The antennular peduncle is a little longer proportionally in full-grown specimens, while the outer uropod likewise approaches more nearly to the length of the inner ones, though even in full-grown specimens it remains slightly shorter than the latter. This account of the growth changes in *T. macrura* reduces considerably the points of distinction formerly supposed to exist between it and *T. gregaria*. The most conspicuous difference is in the proportional length of the last pleon segment, and this distinction would seem to hold throughout life. *T. macrura* is, besides, a much more slender and graceful form than *T. gregaria*, with its parts proportionally attenuated.

Distribution.—*T. macrura* was recorded from several localities in the Southern Ocean, South Atlantic, and Antarctic Ocean by the 'Challenger.' It has since been noted by Stebbing from the neighbourhood of the Falkland Islands, and by Coutière from the collections of the French Antarctic Expedition. These records, together with the list of localities for specimens in the present collection, indicate that the species has a wide range in the waters of the southern temperate and Antarctic regions, but its northern limit would seem to be the 40th parallel of south latitude.

EUPHAUSIAN LARVÆ.

The larvæ listed below could not be referred to any species, and are merely noted here for completeness.

Lat. $57^{\circ} 25' 30''$ S., long. $151^{\circ} 45'$ E., 21. 11. 01, numerous Euphausian *Metanauplii* and *Calyptopis* larvæ, and two *Furcilia*s.

The *Metanauplii* and *Calyptopis* larvæ are characterised by the presence of a short blunt posterior median spine on the carapace. The front part of the latter, which forms the hood over the eyes, appears to have its margin quite smooth. In the majority of the *Calyptopis* larvæ a small spine on the lateral margins of the carapace is clearly present. The apex of the telson is very slightly emarginate. The largest *Calyptopis* larva measures 4 mm. in length.

Lat. $56^{\circ} 31'$ S., long. $156^{\circ} 19' 30''$ E., 22. 11. 01, seventeen *Calyptopis* and fifty *Furcilia* larvæ.

The *Calyptopis* larvæ belong to the same species as in the preceding lot.

The *Furcilia* larvæ measure from 2.5 to 4 mm. They present no features of note, but from their size they probably belong to a smaller species of adult than the *Calyptopis* larvæ which accompany them. All present a lateral spine on the carapace, and the rostrum is in the form of an acutely produced triangular plate.

Lat. $54^{\circ} 1'$ S., long. $170^{\circ} 49'$ E., 27. 12. 01, numerous *Metanauplii*, *Calyptopis*, and *Furcilia* larvæ.

All these are apparently stages of one species. The largest *Calyptopis* larva measures 3 mm. and is without a posterior median spine on the carapace. The anterior margin of the hood is smooth; there is a lateral spine on the carapace, and the apex of the telson is very lightly convex. The largest *Furcilia* measures 4.5 mm.

Lat. $61^{\circ} 13' 30''$ S., long. $173^{\circ} 33'$ E., 31. 12. 01, one *Furcilia* larva, 5 mm., apparently the same species as the following larvæ.

Lat. $63^{\circ} 4' 24''$ S., long. $175^{\circ} 47' 57''$ E., 1. 1. 02; numerous *Furcilia* larvæ from 4 mm. to 5.25 mm. in length, and apparently the same species as the preceding larva.

Wood Bay, 22. 2. 04, numerous small *Metanauplii* and *Calyptopis* larvæ, the largest of which measured 2 mm.

Lat. $70^{\circ} 29' 27''$ S., long. $168^{\circ} 51' 46''$ E., 26. 2. 04, one late *Cyrtopia* larva, 9 mm. in length, which, from its size, is probably *Euphausia superba*.

Lat. $49^{\circ} 40'$ S., long. $112^{\circ} 18' 30''$ W., 12. 6. 04; forty-eight larvæ, from *Calyptopis* stage to post-larval form, measuring 5 mm., and probably the larvæ of *Thysanoëssa macrura*.

ORDER MYSIDACEA.

FAMILY PETALOPHTHALMIDÆ, Czerniavsky.

Petalophthalmidæ, Czerniavsky, 1882.

Petalophthalmidæ, Holt and Tattersall, 1906 (2).

When defining this family Holt and Tattersall, 1906 (2), overlooked the fact that it had been established and defined, albeit rather incompletely, by Czerniavsky (1882) a quarter of a century previously. Czerniavsky, however, had no specimens of any of

the genera of the family before him, but drew up his definition from the descriptions and figures of Willemoes-Suhm (1875). He includes in the family the single type genus, *Petalophthalmus*, Will.-Suhm, with two species—*P. armiger*, Will.-Suhm, and *P. willemoesii*, a new species which he founds for the reception of the female ascribed by Suhm to *P. armiger*.

Faxon and Hansen, however, have since pointed out that the female specimen described by Will.-Suhm is in reality a *Boreomysis*, probably *B. scyphops*, G. O. Sars, so that if this latter view of its identity be adopted, *P. willemoesii* becomes a synonym of *B. scyphops*.

Czerniavsky's definition of the family is inadequate, inasmuch as no reference is made therein to the remarkable characters of the carapace, and the first and second thoracic limbs, while the importance which is given to the supposed characters of the exopods of the thoracic limbs is exaggerated, the difference in development as compared with those of the *Mysidæ* being very slight.

The definition given by Holt and Tattersall, 1906 (2), may, therefore, be adopted with some slight alteration in the characters ascribed to the eyes, rendered necessary by recent discoveries.

Examination of British specimens of *Hansenomysis fyllæ* (Hansen, 1887) has revealed the fact that eyes are, in reality, present in this species. They resemble those described below for the Antarctic species, except that the lappets are much reduced and almost obsolete.

Further, in a new species of *Petalophthalmus*, *P. oculatus*, recently defined by Illig (1906), the eyes are described as well developed, with the cornea bright brown in colour and distinctly faceted.

In the amended definition of the family, therefore, the description of the eyes would read:—*Eyes* (first cephalic appendages) small, either imperfectly developed as lamellar or spiniform organs, without visual elements, or furnished with a distinct cornea in which visual elements are clearly defined and functional.

GENUS HANSENMYSIS, Stebbing.

Arctomysis, Hansen, 1887 (*non* Czerniavsky, 1883).

Hansenomysis, Stebbing, 1893.

Hansenomysis, Holt and Tattersall, 1906 (1 and 2); Tattersall, 1907.

The name *Arctomysis*, given to this genus by Hansen (1887), having been already used by Czerniavsky (1883) for an entirely different form, was changed to *Hansenomysis* by Stebbing (1893). *Arctomysis* Czerniavsky is itself a synonym of *Boreomysis* G. O. Sars.

Of the other three genera belonging to the *Petalophthalmidæ*—*Petalophthalmus*, *Ceratomysis* and *Scolophthalmus*, *Hansenomysis* comes nearest to the last. Both agree in having the first thoracic limbs devoid of exopods and lacking the internal lamelliform meral lobe, and in the presence of well-developed exopods to the second

thoracic limbs. Whereas, however, in *Scolophthalmus* the rostrum is prominent and the eyes are modified into sharp spiniform organs, *Hansenomysis* has the rostrum obsolete and the eyes more or less leaflike.

Males of this genus have not yet been noted, but specimens of that sex of the northern species, *H. fyllæ* (Hansen, 1887), have come into my hands. Detailed examination and description are reserved for a future occasion, but it may be mentioned here that, besides having the pleopods biramous, males also have the basal portion of the inner flagellum of the antennule considerably thickened and adorned with rings of setæ.

HANSENOMYSIS ANTARCTICA.

(Pl. V., Figs. 1-19.)

Hansenomysis antarctica, Holt and Tattersall, 1906 (1).

Locality of capture.—Off Coulman Island, 100 fathoms, two specimens, females, 20 mm.

Form (Fig. 1) compact, rather slender, tapering considerably towards the posterior end.

Carapace (Figs. 1 and 3) short, sub-membranous, leaving the last two thoracic segments completely exposed, and part of a third visible behind its posterior emargination; anterior border produced, but very slightly, into a broadly and evenly-rounded but somewhat strongly upturned rostrum; antero-lateral angles evenly rounded and extending forwards as much as the rostrum; cervical sulcus well marked and rather deep, the posterior margin bounded by a conspicuous and rather sharp ridge formed by the carapace. Behind the cervical sulcus is a shield-shaped dorsal area, indicating the attachment of the carapace to the thorax, behind, and on either side of which the wings of the carapace are free. A slight ridge runs from the antero-lateral angles, first downwards and then posteriorly, to meet the cervical sulcus, while a shallow groove runs forward on each side from the dorsal shield-shaped area, thus marking off a hepatic area, on which is a prominent forwardly-directed spine with a broad base. A shallow depression follows the base of the rostrum, and merges on either side into the groove formed by the ridge from the antero-lateral angles. A small blunt and rounded spine is present on the gastric area.

Pleon (Fig. 1) 9 mm. in length, a little longer than the thorax, which measures 8 mm. from the eyes to the posterior margin of the last free segment; segments cylindrical, postero-lateral inferior margins not at all produced as epimera; first segment arcuate in dorsal contour, its anterior margin slightly raised above the level of that of the last thoracic segment, its posterior margin broadly produced, so as to partly cover the second segment, the whole forming a sort of "cap" over the junction of the thorax and pleon; second to fifth segments sub-equal in length and succeedingly narrower; sixth segment narrower than any of the preceding ones, and nearly twice as long.

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Eyes (Figs. 1, 2 and 3) small, united at their base into a thick flattened pad, from the anterior part of which proceed two thin, short, sub-triangular, slightly-diverging lappets, which do not reach the middle of the basal joint of the antennular peduncle; visual elements entirely absent.

Antennular peduncle (Fig. 2) short and stout, its three joints sub-equal in length and quadrangular in outline; basal joint, with a single long seta on its internal distal corner, and a more or less continuous submarginal row of setæ across the anterior dorsal region; second joint with about seven long stout plumose setæ on its inner margin and two or three long setæ on the outer distal corner; third joint with about eleven long stout plumose setæ on the inner margin. On the dorsal surface of the basal joint, partly concealed by the eye in dorsal view, is an organ of rather problematical function (Figs. 2, 4 and 5). It appears to consist of a shallow depression bounded by a raised ridge marked with pigment, and overhung by a membranous flap, which apparently rises from its posterior border. The flap only imperfectly covers the depression. In the preliminary notice of this collection it was suggested that this organ might prove to be auditory in function, but under moderately high powers of the microscope no otoliths or even sensory hairs could be distinguished in the shallow pit.

Antennal peduncle longer than the antennular, and considerably more slender; distal joint shorter than the preceding.

Antennal scale (Fig. 2) lanceolate in shape, about three-and-a-half times as long as broad, apex evenly rounded, the whole of the inner margin and distal third of the outer margin setose; proximal two-thirds of the outer margin devoid of setæ, but armed with eleven strong spines, the proximal one of which is the shortest, and is situated at the end of the proximal quarter of the outer margin, the spines increasing in size distally; spine on the outer distal corner of the basal joint short, but prominent.

Mandibles (Fig. 6) with the cutting edge prominent and molar process well-developed and rather long; between the cutting edge and the molar process is a single spine-like seta, and in the left mandible a *lacinia mobilis* in addition; palp (Fig. 7) rather long and powerfully developed, terminal joint shorter than the penultimate, both joints armed on both outer and inner margin with numerous long and rather stout setæ.

First maxilla (Fig. 8) having the outer lobe much larger than the inner, and armed at its apex with about thirteen spines, behind which is a row of five plumose setæ; inner lobe armed at its tip with four long plumose setæ.

Second maxilla (Fig. 9) consisting of the usual three lobes, a two-jointed palp and outer setiferous plate, the setæ arming the appendage being numerous and rather strong.

First thoracic limb (Fig. 10) short and stout, devoid of exopod, but with well-developed epipod; third joint small; fourth joint with numerous setæ and a row of

six short stout spines on its inner margin; fifth joint with three, sixth joint two, and seventh joint four rather long, strong plumose spines on their inner margins as well as numerous setæ.

Second thoracic limbs (Fig. 11) with the endopods longer and rather more slender than the first, exopods well developed; fourth or meral joint produced internally into a large setiferous lamelliform lobe nearly as long as the fifth joint; the latter, the longest joint of the limb, longer than the combined length of the sixth and seventh joints, its outer margin armed with a single seta, the distal half of the inner margin slightly excavate with a row of eight short, closely-set plumose spines and a single long plumose seta on the emarginate portion, and a few long simple setæ, set widely apart, on the proximal portion of the inner margin; sixth joint longer than the seventh, its outer margin armed with a few long setæ, the proximal portion of the inner margin bearing a row of about nine short closely-set plumose spines and a single long plumose seta, the distal portion of the inner margin with a few long simple setæ; seventh joint small, armed with numerous long and rather stout simple setæ.

Third to fifth thoracic limbs (Fig. 12) with the endopods feeble, long and slender; sixth joint slightly longer and more slender than the fifth; seventh joint very small, forming with two strong spines a very minute chela, densely clothed with short fine setæ; the rest of the endopod armed with a few short scattered setæ.

Sixth to eighth thoracic limbs (Fig. 13) with the endopods slightly longer and stouter than those of the three preceding pairs; sixth joint shorter than the fifth; seventh joint small and bearing a long slightly-curved nail, the junction between the nail and seventh joint being indicated by a seta on the inner margin; rest of the endopod feebly armed with short setæ.

Exopods of the second to eighth thoracic limbs well-developed; basal joint long and rather narrow, the outer distal corner rounded; flagelliform part composed of from ten to thirteen joints.

Incubatory lamellæ, seven pairs, situated on the second to eighth thoracic limbs.

Pleopods (Figs. 14 to 18) in the female uniramous, the first pair small, succeeding pairs increasing in size to the fifth pair, which are slightly longer than the sixth segment of the pleon; first four pairs one-jointed; fifth pair two-jointed, the second joint longer than the first; all the pleopods bearing long setæ at the apex.

Telson (Fig. 19) rather massive, longer and a little wider than the last segment of the pleon, dorsally grooved, oblong in shape, slightly wider at the apex than at the base, its margins lightly arcuate; apex truncate or very lightly emarginate, bearing a single median spine with six or seven long spines on either side; lateral margins armed with from twenty-five to thirty fairly long spines arranged more or less in series.

Inner uropods broken in both specimens.

Outer uropods (Fig. 19) nearly twice as long as the sixth segment of the pleon, two-jointed, the terminal joint about one-seventh as long as the basal; outer margin

of the basal joint without setæ, but armed with twenty-one stout spines increasing in size posteriorly.

Length of adult and ovigerous female, 20 mm. from the eyes to the tip of the telson.

Colour of preserved specimens light brown, with a broad band of dark brown pigment across the dorsal surface of the first segment of the pleon and scattered patches of dark pigment on the lateral parts of the carapace, basal joints of the antennules and antennæ and the basal membranous pad of the eyes.

One of the specimens has young, considerably advanced in development, in the incubatory lamellæ.

In both specimens the telson is considerably damaged, and the description and figures have been drawn up from both specimens and fragments of the telsons found along with them. This fact must be borne in mind in dealing with specimens of this species which may be found by future expeditions. It was a matter of considerable surprise and no little interest to find in this collection two specimens belonging to a genus hitherto known only from a single specimen from Greenland and two taken off the coast of Ireland.

There can be no doubt that *H. antarctica* is co-generic with *H. fyllæ* (Hansen, 1887). All the distinctive characters of generic importance in the mouth parts and thoracic limbs of the latter are reproduced in *H. antarctica* down to the minutest detail. The points of difference between the two species are, however, sufficiently well-marked and numerous enough to justify specific separation. They may be pointed out as follows:—

H. antarctica is in general build a more robust and less fragile species than *H. fyllæ*.

Antennæ.—In *H. fyllæ* the terminal joint of the peduncle is longer than the penultimate, whereas in *H. antarctica* the reverse obtains.

Antennal scale.—In *H. fyllæ* the outer margin bears only five spines, between which are numerous setæ. In *H. antarctica*, on the other hand, there are eleven spines on the outer margin and no setæ between them.

Telson.—The telson in Hansen's type-specimen was broken, but so much of it as remained showed that the armature consisted of both spines and setæ. In *H. antarctica* the telson is armed with spines only, which are probably more numerous than in *H. fyllæ*. The shape of the telson in both species is also somewhat divergent. That of *H. antarctica* recalls rather markedly the telson of *Petalophthalmus armiger* as figured by Sars in the 'Challenger' Report.

Outer uropods.—*H. fyllæ* has the outer uropods armed with both spines and setæ, whereas in *H. antarctica* there are spines only present. The spines in *H. fyllæ* number six, while in *H. antarctica* there are twenty-one.

Pleopods.—The type specimen of *H. fyllæ* had only one pleopod remaining. This was one of the third pair, and is described by Hansen as biarticulate. Presumably,

therefore, the fourth and fifth pleopods will likewise be found to be biarticulate when perfect specimens are examined. In *H. antarctica* only the fifth pleopods are biarticulate, the remaining pairs consisting of a single joint only.

The eyes in the genus are described for the first time. They are remarkable chiefly for their small size and degenerate structure, for the complete absence of visual elements, and the subservience, either entirely or in great part, of ophthalmic functions to those of probably a tactile nature.

The cap-like form of the tergum of the first segment of the pleon recalls the somewhat similar form of the third pleon segment in many Carida, and suggests that the posterior part of the body is capable of great ventral flexure. The 'Discovery' expedition is to be congratulated on the finding of this species, by far the most interesting Schizopod in the collection.

FAMILY MYSIDÆ.

SUB-FAMILY LEPTOMYSINÆ, Norman.

GENUS PSEUDOMMA, G. O. Sars.

PSEUDOMMA BELGICÆ.

(Plate VI., Figs. 1-8.)

Pseudomma belgicæ, Holt and Tattersall, 1906 (1).

Locality of capture.—Lat. $78^{\circ} 25' 40''$ S., long. $185^{\circ} 39' 6''$ E., 300 fathoms, one specimen, immature female, 23 mm.

Form (Fig. 1) compact and moderately stoutly built.

Carapace (Fig. 1) large, less than half the total length of the body, covering laterally all the segments of the thorax, but dorsally exposing the last one behind its posterior emargination; its anterior margin very slightly produced into a blunt, very broadly rounded rostrum; antero-lateral angles rounded; cervical sulcus well marked.

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Pleon (Fig. 1), excluding the telson, about half the total length of the body from the eye to the tip of the telson; first four segments subequal in length and slightly longer than the fifth; sixth segment twice as long as the fifth.

Eye plates (Fig. 1) contiguous, exhibiting only a very slight anterior median cleft; each plate subquadrangular or rhomboidal in shape, nearly twice as broad as long, antero-lateral angles rounded, anterior margin nearly straight, no serrations or armature of any kind; no pigment present in preserved specimens; corneal lenses absent, but the ramifications of the optic nerve are clearly visible in dorsal view.

Antennular peduncle (Fig. 1) short and stout, not extending beyond half the length of the antennal scale; basal joint almost entirely covered by the ocular laminae, a few plumose setae on each anterior corner; second joint very short, more than twice as broad as long, a few short setae on the outer distal corner, inner margin with a few longer plumose setae; third joint longer than either of the other two and slightly

narrower, rectangular in shape, outer margin unarmed, inner margin beset with a few plumose setæ.

Antennal peduncle (Fig. 1) equal in length to the antennular, but more slender; last two joints subequal in length.

Antennal scale (Fig. 1) slightly longer than the last segment of the pleon and twice as long as the antennular peduncle, about three and a half times as long as broad, outer margin entire and terminating in a very strong spine, beyond which the apex of the scale is but slightly produced; spine on the basal joint short and acute.

Mouth parts (Figs. 2, 3, 4, and 5) exhibit no salient points of difference from those of the type species of the genus *P. roseum*, G. O. Sars.

First and second thoracic limbs (Figs. 6 and 7) agreeing in the main with those figured by Sars for *P. roseum*, but a dactylus is distinctly visible among the dense mass of plumose setæ arming the terminal joints, though it is smaller and shorter than the terminal joint; exopods having the outer distal corner of the basal joint round, though produced, and the flagelliform part composed of ten to twelve joints.

Telson (Fig. 8) slightly shorter than the last segment of the pleon, tapering to an evenly rounded apex which is one-third as wide as the base; apex armed with a median pair of plumose setæ and four pairs of strong smooth spines, the innermost and largest of which equals one-sixth of the telson in length; distal half of the lateral margins armed with five shorter spines.

Inner uropods half as long again as the telson, armed with a single long spine in the region of the inner posterior corner of the otocyst.

Outer uropods about twice as long as the telson.

Length of an immature female, 23 mm. By an error the specimen^{*} was described in the preliminary report as adult. This is scarcely correct, since the incubatory lamellæ are still only about half developed, so that the adult female probably reaches to nearly 30 mm. The specimen is badly mutilated, the third to the eighth thoracic limbs being entirely absent.

P. belgica is far and away the largest species of the genus yet described, none of the other ten known species exceeding 15 mm., whereas adult specimens of this species must reach to nearly 30 mm. It is most nearly related to *P. sarsi* Will.-Suhm, described by Sars (1885) from the 'Challenger' collections for specimens taken at Kerguelen Island. Besides the great difference in size (*P. sarsi* measures only 14 mm., adult specimens), the only other conspicuous difference is in the ocular laminae. In *P. sarsi* the antero-lateral angles of the eye-plates are serrate, whereas in *P. belgica* they are quite smooth. Minor differences in the shape of the antennal scale and telson may also be noted. The antennal scale in *P. sarsi* has the spine terminating the outer margin less strong than in *P. belgica*, while the apex of the scale is more produced. The telson in *P. sarsi* has the apex more truncate than *P. belgica* and the lateral margins, according to Sars, bear eight short spines. Mr. Holt, however, who has kindly examined the types of *P. sarsi* in the British

Museum, informs me that only five spines are present on the lateral margins, so that the armature of the telson of *P. sarsi* approximates closely to that of *P. belgicae*.

The only other species of *Pseudomma* having smooth ocular laminae is *P. australe*, G. O. Sars (1885), from Bass Straits, Australia. The vastly different form of the antennal scale in the latter, however, abundantly distinguishes it from *P. belgicae*.

Besides the single 'Discovery' specimen, this species is also known from the 'Belgica' collections, and has been described by Hansen in MS. under the name which is here used. It is possible that the mutilated specimen noted by Sars (1885, p. 191) from 1675 fathoms in the Antarctic Ocean may have belonged to this species rather than to *P. sarsi*. Sars notes that it was much larger than the latter.

Genus DACTYLAMBLYOPS, Holt and Tattersall.

Dactylamblyops, Holt and Tattersall, 1906 (1).

Dactylerythroops, Illig, 1906, *non* Holt and Tattersall, 1905.

? *Amblyops (pars)*, Ohlin, 1901.

Dactylamblyops, Tattersall, 1907.

This genus was established for the reception of the single rather mutilated specimen of *D. hodgsoni* in the present collection. Since the publication of the preliminary notice of the 'Discovery' Schizopoda, however, two closely allied species have been discovered off the west coast of Ireland (Tattersall, 1907). A clearer idea of the exact relationships of the genus has thus been gained, and while the species referred thereto appear, in the present state of our knowledge, to form a natural group, it is undeniably very nearly allied to *Dactylerythroops*, Holt and Tattersall (1905), to which genus, indeed, the present species was referred by Illig (1906).

The definition of the genus given by Holt and Tattersall, 1906 (1), may therefore be amended as follows:—

DACTYLAMBLYOPS, Holt and Tattersall.

Characters generally as in *Amblyops*, G. O. Sars, except:—

Eyes placed close together, but not contiguous, more or less pyriform in shape, furnished with distinct and definite peduncles; visual elements imperfectly developed, numerous, reaching to the surface of the eye, and probably directly functional as organs of sight; outer distal corner rounded, and not produced into a digitiform process; a short blunt process always present on the inner and upper surface.

Second thoracic limbs with the endopods not noticeably short, but well developed, and considerably longer than the endopods of the first thoracic limbs.

Telson not very long, triangular in shape, the distal parts of its margins armed with more or fewer spines; median setae absent.

Type species, *D. hodgsoni*, Holt and Tattersall.

The absence of median setæ from the apex of the telson is not necessarily of generic importance, since the genera *Pseudomma* and *Dactylerythropros* both contain species in some of which these setæ are present, and others in which they are wanting. As, however, all three species at present referred to this genus are without median apical setæ, it is convenient to retain this character in the generic definition.

DACTYLAMBLYOPS HODGSONI.

(Pl. VI., Figs. 9-16.)

Dactylamblyops hodgsoni, Holt and Tattersall, 1906 (1).

Dactylerythropros arcuata, Illig, 1906.

Locality of capture:—Lat. $66^{\circ} 52' 09''$ S., long. $178^{\circ} 08' 15''$ E., 2030 fathoms, one specimen, male, 13 mm.

The single specimen in the collection is considerably damaged, the antennules, antennal scales, and the third to the eighth thoracic limbs being missing. A complete description is therefore not possible, but it is hoped that as many of the characters as can be made out with certainty will suffice for future recognition of the species in collections.

Carapace submembranaceous, covering all the thoracic segments except the last one, anterior margin produced into a blunt, broadly but evenly rounded rostrum projecting between the eyes; cervical sulcus well marked; antero-lateral angles rounded.

Pleon slightly longer than the carapace; first five segments subequal in length; sixth nearly twice as long as the fifth.

Eyes (Fig. 9) small, placed on definite peduncles, not in any way contiguous, pyriform in shape, external angle evenly rounded, a short digitate process arising from the inner dorsal face; visual elements imperfectly developed, apparently represented by numerous minute granular bodies with a refractive centre; a large opaque ganglionic mass, probably the optic nerve, visible in the peduncle, from which a nerve fibre proceeds to the cornea.

Antennal peduncle short, composed of three subequal quadrangular joints.

Antennal scale broken on both sides, but there does not appear to be a spine on the outer corner of the basal joint.

Mouth parts (Figs. 10-13) not differing markedly from those figured by Sars for *Amblyops abbreviata* (1870-79).

First thoracic limbs (Fig. 14) with the endopod substantially of the same form as in *A. abbreviata*.

Second thoracic limbs (Fig. 15) of essentially the same structure as in *A. abbreviata*, but with the endopod apparently much longer, being nearly twice as long as the endopod of the first thoracic limbs.

Genital appendix to the last thoracic limbs of the male terminating in two lobes, the larger of which bears six long setæ, the smaller one being devoid of setæ, but apparently having a covering of very fine hairs.

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Pleopods in the male agreeing in all points with those of males of the genus *Amblyops*.

Telson (Fig. 16) not quite as long as the last segment of the pleon, triangular in shape, tapering evenly to a narrowly rounded apex, nearly twice as long as broad at its base; distal half of each lateral margin armed with nineteen spines, increasing in length towards the apex, the terminal ones about one-tenth of the total length of the telson; median setæ absent.

Uropods broken on both sides, but the inner one possesses a single strong spine on the ventral surface at the inner posterior angle of the otocyst.

Length of the single specimen, an apparently adult male, 13 mm.

There can be little doubt, I think, that *Dactylerythrops arcuata*, Illig (1906), is the same species as the present one. Minor differences, it is true, are to be noticed. For instance, the visual elements of the eye in Illig's species are represented as larger and less numerous than in *D. hodgsoni*. It may be that in the former preservation has caused the visual elements to mass in groups of more or fewer lenses, since in the 'Discovery' specimen, as the figure (Fig. 9) shows, the visual elements are not regularly arranged, but more numerous in some places than others, an effect probably due to the mode of preservation.

Moreover, in *D. arcuata*, the telson is not quite so long compared with the breadth at its base as in *D. hodgsoni*, and is furnished with only eighteen spines on each lateral margin. But these differences are insignificant when compared with the general agreement between the two species in most points. One or two characters may be added to the above diagnosis from Illig's description and figures.

Antennular peduncle long and rather stout, last joint the largest and nearly equal to the combined length of the other two.

Antennal scale slightly over-reaching the antennular peduncle, about four times as long as broad, outer margin entire, and terminating in a short spine beyond which the apex of the scale is only slightly produced.

Four species of this genus are now known, *D. sarsi* (Ohlin, 1901), *D. thaumatops* and *D. goniops*, Tattersall (1907), and the present species.

From the other three species, *D. hodgsoni* is at once distinguished by the shape of the eye. In *D. sarsi* the eye is acutely pointed in front; in *D. thaumatops* it is of quite peculiar form, with an outer equatorial membranous ridge, while in *D. goniops* the eye is quadrangular rather than pyriform in shape. Otherwise the four species are rather closely allied and form quite a distinct generic group to themselves.

D. hodgsoni is at present only known from very deep water in the Antarctic Ocean. Illig's specimens were collected over a depth of 4000–5000 metres, while the present specimen was dredged in 2030 fathoms (*ca.* 3700 metres).

SUB-FAMILY MYSIDETINÆ, Holt and Tattersall.

GENUS MYSIDETES, Holt and Tattersall.

? *Mysidopsis*, G. O. Sars, 1883 and 1885, *non* G. O. Sars, 1864.

Mysideis (*pars*), Holt and Tattersall, 1905, *non* G. O. Sars, 1869.

Mysidetes, Holt and Tattersall, 1906 (1) and (2).

Metamysidella, Illig, 1906.

A full diagnosis of this genus and a statement of its possible affinities have already appeared, Holt and Tattersall (1906 (2)). While agreeing in most characters with the normal genera of the *Leptomysinae*, the rudimentary nature of the pleopods of the male offers a feature of sharp distinction from members of that sub-family and has necessitated the establishment of a new sub-family for its reception. In the form of the telson and armature of the inner uropods it approaches rather closely to the genera *Heteromysis* and *Mysidella*, but whereas in the former the third, and in the latter the first, thoracic limbs are peculiarly modified and strongly armed, in *Mysidetes* both these limbs are of normal structure. The external resemblance of females of the present genus to those of *Mysidopsis* and *Mysideis* has already been noted, and a comparative table of their respective characters was given (Holt and Tattersall 1906 (2)). It will suffice here to mention that *Mysidetes* differs from *Mysidopsis*, (1) in having a well-developed molar tubercle to the mandible; (2) in the presence of a setiferous expansion of the inner margin of the basal part of the second maxilla, and (3) in having the endopods of the first thoracic limbs seven-jointed instead of six.

From *Mysideis* it is distinguished by having the endopods of the first and second thoracic limbs of normal stoutness and usual armature, instead of being unusually massive and strongly armed; while from both genera it differs, (1) in having the cleft of the telson armed with spines; (2) in the uropods having a row of spines in their inner edges extending well over half-way down their length, and finally, (3) in having the pleopods of the male rudimentary.

Mysidopsis incisa, G. O. Sars (1885), probably belongs to this genus. It was described in the 'Challenger' Report from a specimen taken off Australia. This specimen is a female much mutilated, and dissection was neither practicable nor desirable. The telson and inner uropods, however, conform to the type found in *Mysidetes*.

The genus *Metamysidella* (Illig, 1906) is undoubtedly synonymous with this genus, though no mention is made in the diagnosis of the character of the pleopods of the male. In all other features the two genera agree absolutely.

MYSIDETES POSTHON.

(Pl. VII., Figs. 1-13.)

Mysidetes posthon, Holt and Tattersall, 1906 (1).

Localities of captures:—Off Coulman Island, 100 fathoms, one specimen, male, 25 mm.

Winter Quarters, 5. 6. 02. 56 fathoms, one specimen, female, 23 mm.

Winter Quarters, 29. 8. 03. No. 12 Hole, 25-30 fathoms, three specimens, two females and one male, 21 mm.

General form (Fig. 1) compact and moderately robust.

Carapace (Fig. 1) leaving the last segment of the thorax exposed posteriorly; antero-lateral margins produced into a short obtuse rostrum not extending beyond the eyestalks; antero-lateral corners rounded, cervical sulcus well marked. 1908.9.22.140-14

Pleon (Fig. 1) longer than the carapace; first five segments sub-equal in length; sixth segment about once and a half to twice as long as the fifth.

Eyes (Fig. 1), large, globose; pigment brown.

Antennular peduncle (Fig. 2) much shorter than the antennal scale; basal joint longer than the terminal joint, and having its outer corner produced beyond the distal extremity of the second joint, the produced part tipped with four or five long setae; second joint small; third joint almost square in shape; antennular brush in the male rather small and feebly hirsute.

Antennal peduncle (Fig. 3) slightly shorter and more slender than the antennular, and little more than half as long as the scale; third joint shorter than the second.

Antennal scale (Fig. 3), lanceolate in shape; between four and five times as long as broad; setose all round; a minute second joint at the apex; a spine on the outer distal corner of the basal joint.

Mandibles (Fig. 4) with a well-developed molar process and cutting edge; palp (Fig. 5) with the second joint somewhat expanded and armed with long setae on both margins; third joint not much expanded, a row of strong plumose setae on the lower edge, and two very strong simple spine-like setae at the tip.

Second maxillae (Fig. 7) with the setiferous expansion of the basal joint well developed.

Endopods of the first thoracic limbs (Fig. 8) of about the same build as in the genus *Mysidopsis*, but seven-jointed; masticatory lobe well developed; inner margins of the proximal four joints armed with numerous plumose setae; sixth joint bearing a well-developed nail and beset with numerous plumose setae.

Endopods of the second thoracic limbs (Fig. 9) very similar to those of *Mysidopsis*; longer than the first; sixth joint armed with numerous plumose setae, but in the specimen dissected I was unable to detect a nail, though it may have been broken off.

Endopods of the third thoracic limbs (Fig. 10) with the merus longer than the tarsus; latter composed of six joints; nail well developed and longer than the last joint of the tarsus.

Endopods of the remaining thoracic limbs become successively longer and more slender from the fourth to the eighth; the increase in length takes place chiefly in the ischial joint; the number of joints in the tarsus of the endopods also increases in the more posterior limbs; in one specimen there were six joints in the tarsus of the third limb, six in the tarsus of the fourth, ten in the tarsus of the seventh, and twelve in the tarsus of the last limb.

Genital appendix (Fig. 11) on the last thoracic limb of the male exceedingly long and slender, equal in length to the first three joints of the limb to which it is attached.

Pleopods (Fig. 12) similar in both sexes, consisting of a single ramus bearing proximally and externally a rather large process tipped with setæ.

Telson (Fig. 13) a little longer than the last segment of the pleon, and more than twice as long as broad at its base; cleft at the apex for nearly a quarter of its length, cleft rather wide, its margins armed with about eighteen teeth on each side; the apex of each lobe of the cleft armed with a pair of spines, the inner one the shorter; lateral margins armed throughout their whole length with about seventy spines, which become arranged in series towards the apex.

Inner uropods slightly longer than the telson, with a row of moderately slender and long spines on its inner ventral margin, varying in number from twenty-six to twenty-eight, and extending from the otocyst to near the apex; spines not arranged in series, but increasing in size distally. In some specimens the spines extend further down the uropod than in others.

Outer uropods about half as long again as the inner.

Length of an adult female with embryos in the brood pouch, 21 mm.; of an apparently adult male, 25 mm. A second female with embryos in the brood pouch measured 23 mm.

It is not a little interesting that this genus should have been discovered almost simultaneously in the northern and southern hemispheres, *M. farrani*, Holt and Tattersall (1906 (2)) having just been described when the 'Discovery' collections came to hand.

M. posthon is a more stoutly built form than *M. farrani*, and is further distinguished from the latter in the following characters:—

Antennules.—*M. farrani* has not the outer corner of the basal joint of the peduncle produced nearly as much as in *M. posthon*.

Thoracic limbs.—The tarsus of the endopods in *M. posthon* is composed of six to twelve joints, while in *M. farrani* there are only four.

Genital appendix to the last thoracic limb of the male is much longer and more slender in *M. posthon* than in *M. farrani*.

Pleopods.—The lateral lobe is less developed in *M. farrani* than in *M. posthon*.

Telson.—In *M. farrani* the cleft is armed with only about thirteen spines, whereas in *M. posthon* there are about thirty-six. In the former, moreover, the lateral margins of the telson are armed with not more than twenty-six spines, not arranged in series, and situated only on the distal two-thirds of the margin. In *M. posthon* the lateral margins are armed throughout the entire length with about seventy spines, arranged, at any rate, distally in series. The whole telson in *M. farrani* is more slender than in *M. posthon*.

The spines on the inner uropods of *M. posthon* appear to be somewhat longer than in *M. farrani*. I have already expressed the opinion that the genus *Metamysidella* of Illig is synonymous with *Mysidetes*. The type species of the former, *M. kerguelensis*, Illig (1906), is, however, a much smaller species than *M. posthon*, measuring only 10 mm. in length. It is otherwise closely allied to the latter, but differs in having the antennular peduncle almost equal in length to the antennal scale and in the details of the armature of the telson.

If *Mysidopsis incisa*, G. O. Sars (1885), should in future be found referable to the genus *Mysidetes*, as seems probable, it differs from the present species in size, in having fewer joints in the tarsus of the thoracic limbs, and in the details of the armature of the telson.

I should mention here that I do not attach too great an importance to the difference in size between *M. kerguelensis* and *Mysidopsis incisa* as compared with *M. posthon* as a specific character, for I have found both males and females of *M. farrani* quite sexually mature at 15 mm. (judging from the characters of the antennular brush in the male and the incubatory lamellæ in the female), while the species, fully grown, reaches to 28 mm. in total length.

SUB-FAMILY MYSINÆ.

GENUS ANTARCTOMYSIS, Coutière.

Mysis, Holt and Tattersall, 1906 (1).

Antarctomysis, Coutière, 1906.

This genus has been recently established by Coutière for the reception of the species briefly noted as *Mysis maxima*, Hansen (MS.), in the preliminary notice of this collection.

There can be little doubt as to the correctness of the reasons which have led to its formation, since the biramous character of the fifth pair of pleopods in the male offers a character of undoubted generic value, as distinguishing *Mysis maxima* from the genus *Mysis* (*sens. stricto*). The genus *Hemimysis* has the fifth pair of pleopods in the male biramous and natatory, but the third pair are only imperfectly biramous, the outer ramus being very minute and single-jointed, whereas in *Antarctomysis* the third pair resemble the fifth in having both rami multiarticulate and setose.

I became aware, only after the plates illustrating this report had been printed, that the two specimens of *Antarctomysis* in the 'Discovery' collections, referred in the preliminary note to one species *A. maxima*, in reality belong to two distinct but very closely allied species. On my appealing to Dr. Hansen, he very kindly sent me some notes and sketches of *A. maxima*, and a second species of the genus discovered by him in a collection which he is engaged in working out. These notes and drawings placed the matter beyond doubt, the larger of my two specimens clearly belonging to Hansen's second species. I note the species here, and give the points of distinction, but leave a full description and name to Dr. Hansen. The drawing on Pl. VIII., Fig. 1, was taken from the real *A. maxima*, but the remaining figures on the plate represent the appendages of the second species, which, at the time, I took to be *A. maxima* also. They will probably be of use, however, in illustrating how closely allied the two species are when they are compared with the figures given by Coutière (1906) of the true *A. maxima*.

ANTARCTOMYSIS MAXIMA.

(Pl. VIII., Fig. 1.)

Mysis maxima (*pars*), Holt and Tattersall, 1906 (1).

Antarctomysis maxima, Coutière, 1906.

Locality of capture.—Winter quarters, 5. 6. 02, D-net hole, 56 fathoms, one specimen, immature male, 33 mm.

Coutière (1906) has recently described this species in great detail from mature examples collected by the French Antarctic Expedition. I have practically nothing to add to his description, but since no figure of the entire animal was given by him, my drawing on Pl. VIII., Fig. 1 may be useful.

Coutière does not mention the spines arming the inner ventral edge of the inner uropod. They extend from the posterior inner corner of the otocyst to the extreme tip of the uropod, and posteriorly, at least, are arranged in series of twos, threes and occasionally fours. The species would appear to be circumpolar in distribution, since, besides the single specimen in the 'Discovery' collection, it has been taken by the French, Swedish and Belgian Antarctic expeditions; by the two former, in considerable numbers.

ANTARCTOMYSIS sp.

(Pl. VIII., Figs. 2-12.)

Mysis maxima (*pars*), Holt and Tattersall, 1906 (1).

Locality of capture.—Lat. 78° 25' 40" S., long. 185° 39' 6" E., 300 fathoms, one specimen, immature male, 40 mm.

This species is so closely allied to *A. maxima* that I only became aware that it was distinct when too late to properly illustrate it. The figures 2-12 on Plate VIII. were taken from the appendages of this specimen.

1908.9.22.145.

1908.9.22.146.

The species will be fully described and named by Dr. Hansen, so here I will merely note the points of distinction between it and *A. maxima*.

(1) *Eye*.—In *A. maxima* (Pl. VIII., fig. 1) the eye is large and the visual elements occupy a large part of the outer side of the eye-stalk, so that in dorsal view the inner eye-stalk proper is much longer than the outer, and in external lateral view very little of the latter is visible. In the present form the eye is smaller and narrower than in *A. maxima*, the visual elements occupy the terminal part of the eye-stalk only, so that the inner and outer margins of the latter are subequal in length, and in external lateral view practically the whole of the eye-stalk is visible.

(2) *Rostrum*.—In *A. maxima* the angle contained by the antero-lateral margins of the carapace which form the rostrum is equal to or slightly greater than a right angle, so that in lateral view the antero-lateral margins are not very oblique. The tip of the rostrum is produced into a very small spine.

In the new species the angle of the rostrum is considerably less than a right angle, so that the antero-lateral margins of the carapace in lateral view are very oblique. The apex of the rostrum is bluntly rounded.

(3) *Antenna*.—In *A. maxima* the basal joint of the antenna, from which the antennal scale and peduncle arise, bears two spines ventrally, one at each of the outer and inner distal corners. In the new form, only the one on the outer distal corner is present, the inner corner being rounded.

(4) In *A. maxima* the tarsus of the third to the eighth thoracic limbs is seven to eight-jointed (excluding the nail); in the present species the tarsus is six to seven-jointed, so that the two distal joints before the nail are proportionately longer than in *A. maxima* (*cf.* Pl. VIII., Fig. 8, with Coutière (1906), Pl. I., Fig. 11).

In other characters the two species are practically identical.

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EXPLANATION OF THE PLATES.

PLATE I.

Euphausia superba.

- FIG. 1.—Male, 45 mm., dorsal view of anterior end $\times 10$.
 FIG. 2.—Female, 45 mm., dorsal view of anterior end $\times 10$.
 FIG. 3.—“*Glacialis*” stage, dorsal view of anterior end $\times 15$.
 FIG. 4.—Late Cyrtopia stage, dorsal view of anterior end $\times 30$.
 FIG. 5.—Mandibular palp $\times 13$.
 FIG. 6.—Second maxilla $\times 13$.
 FIG. 7.—First maxilla $\times 13$.
 FIG. 8.—First thoracic limb, endopod $\times 9$.
 FIG. 9.—Second thoracic limb, endopod $\times 9$.
 FIG. 10.—Lateral spine on carapace of female, 50 mm. $\times 30$.
 FIG. 11.—Lateral spine on carapace of male, 45 mm. $\times 30$.
 FIG. 12.—Lateral spine on carapace of male, 39 mm. $\times 30$.

PLATE II.

Euphausia crystallorophias.

- FIG. 1.—Male, lateral view of entire animal $\times 6$.
 FIG. 2.—Female, dorsal view of anterior end $\times 15$.
 FIG. 3.—Mandibular palp $\times 30$.
 FIG. 4.—First maxilla $\times 30$.
 FIG. 5.—Second maxilla $\times 30$.
 FIG. 6.—First thoracic limb $\times 20$.
 FIG. 7.—Second thoracic limb, endopod $\times 20$.
 FIG. 8.—Calyptopis larva $\times 40$.
 FIG. 9.—Furcilia larva $\times 20$.
 FIG. 10.—Cyrtopia larva $\times 20$.

PLATE III.

Thysanöessa macrura.

- FIG. 1.—Female, 28 mm., lateral view $\times 6$.
 FIG. 2.—Female, dorsal view of anterior end $\times 10$.
 FIG. 3.—Antennal scale and peduncle $\times 15$.
 FIG. 4.—Mandibular palp $\times 30$.
 FIG. 5.—First maxilla $\times 30$.
 FIG. 6.—Second maxilla $\times 30$.
 FIG. 7.—First thoracic limb, endopod $\times 30$.
 FIG. 8.—Second thoracic limb, endopod $\times 15$.
 FIG. 9.—Seventh thoracic limb, endopod $\times 30$.
 FIG. 10.—Rudimentary eighth thoracic limb $\times 60$.
 FIG. 11.—Endopod of the first pleopod of the male $\times 60$.
 FIG. 12.—Endopod of the second pleopod of the male $\times 60$.

PLATE IV.

*Euphausia triacantha.*FIG. 1.—Male, lateral view $\times 6$.FIG. 2.—Male, dorsal view of anterior end $\times 20$.FIG. 3.—Inner lobe of the endopod of the first pleopods of the male to show copulatory apparatus $\times 80$.*Euphausia vallentini.*FIG. 4.—Outline of antennular peduncle of 'Discovery' specimen $\times 20$.FIG. 5.—Outline of rostrum and basal joint of antennular peduncle of 'Challenger' specimen $\times 30$.FIG. 6.—Inner lobe of the endopod of the first pleopods of the male in 'Challenger' specimen, to show copulatory apparatus $\times 80$.*Euphausia sp.* juv.FIG. 7.—Dorsal view of anterior end of specimen, 10 mm. $\times 60$.FIG. 8.—Lateral view of antennular peduncle of the same specimen $\times 60$.FIG. 9.—Spine on the third segment of the pleon of the same specimen $\times 20$.*Euphausia crystallorophias.*FIG. 10.—Inner lobe of the endopod of the first pleopods of the male, to show copulatory apparatus $\times 80$.

PLATE V.

*Hansenomysis antarctica.*FIG. 1.—Female, dorsal view $\times 10$.FIG. 2.—Enlarged view of anterior end $\times 23$.FIG. 3.—Side view of anterior end $\times 23$.FIG. 4.—Dorsal view of peculiar antennular organ $\times 70$.FIG. 5.—Side view of same $\times 70$.FIG. 6.—Mandible $\times 20$.FIG. 7.—Mandibular palp $\times 20$.FIG. 8.—First maxilla $\times 20$.FIG. 9.—Second maxilla $\times 20$.FIG. 10.—First thoracic limb $\times 20$.FIG. 11.—Second thoracic limb, endopod $\times 10$.FIG. 12.—Third thoracic limb, endopod $\times 10$.FIG. 13.—Sixth thoracic limb, endopod $\times 10$.FIG. 14.—First pleopod $\times 20$.FIG. 15.—Second pleopod $\times 20$.FIG. 16.—Third pleopod $\times 20$.FIG. 17.—Fourth pleopod $\times 20$.FIG. 18.—Fifth pleopod $\times 20$.FIG. 19.—Telson and uropods $\times 20$.

PLATE VI.

*Pseudomma belgicae.*FIG. 1.—Female, dorsal view $\times 10$.FIG. 2.—Mandible $\times 30$.FIG. 3.—Mandibular palp $\times 30$.FIG. 4.—First maxilla $\times 30$.FIG. 5.—Second maxilla $\times 30$.FIG. 6.—First thoracic limb, endopod $\times 13$.FIG. 7.—Second thoracic limb, endopod $\times 13$.FIG. 8.—Telson $\times 20$.

Dactylamblyops hodgei.

- FIG. 9.—Eye, external lateral view $\times 20$.
 FIG. 10.—Mandible $\times 40$.
 FIG. 11.—Mandibular palp $\times 40$.
 FIG. 12.—First maxilla $\times 40$.
 FIG. 13.—Second maxilla $\times 40$.
 FIG. 14.—First thoracic limb, endopod $\times 27$.
 FIG. 15.—Second thoracic limb, endopod $\times 27$.
 FIG. 16.—Telson $\times 20$.

PLATE VII.

Mysidetes posthon.

- FIG. 1.—Female, dorsal view $\times 13$.
 FIG. 2.—Antennular peduncle $\times 18$.
 FIG. 3.—Antennal peduncle with antennal scale $\times 18$.
 FIG. 4.—Mandible $\times 18$.
 FIG. 5.—Mandibular palp $\times 18$.
 FIG. 6.—First maxilla $\times 18$.
 FIG. 7.—Second maxilla $\times 18$.
 FIG. 8.—First thoracic limb, endopod $\times 18$.
 FIG. 9.—Second thoracic limb, endopod $\times 18$.
 FIG. 10.—Third thoracic limb, endopod $\times 18$.
 FIG. 11.—Genital appendix of male $\times 18$.
 FIG. 12.—First pleopod $\times 24$.
 FIG. 13.—Telson $\times 18$.

PLATE VIII.

Antarctomysis maxima.

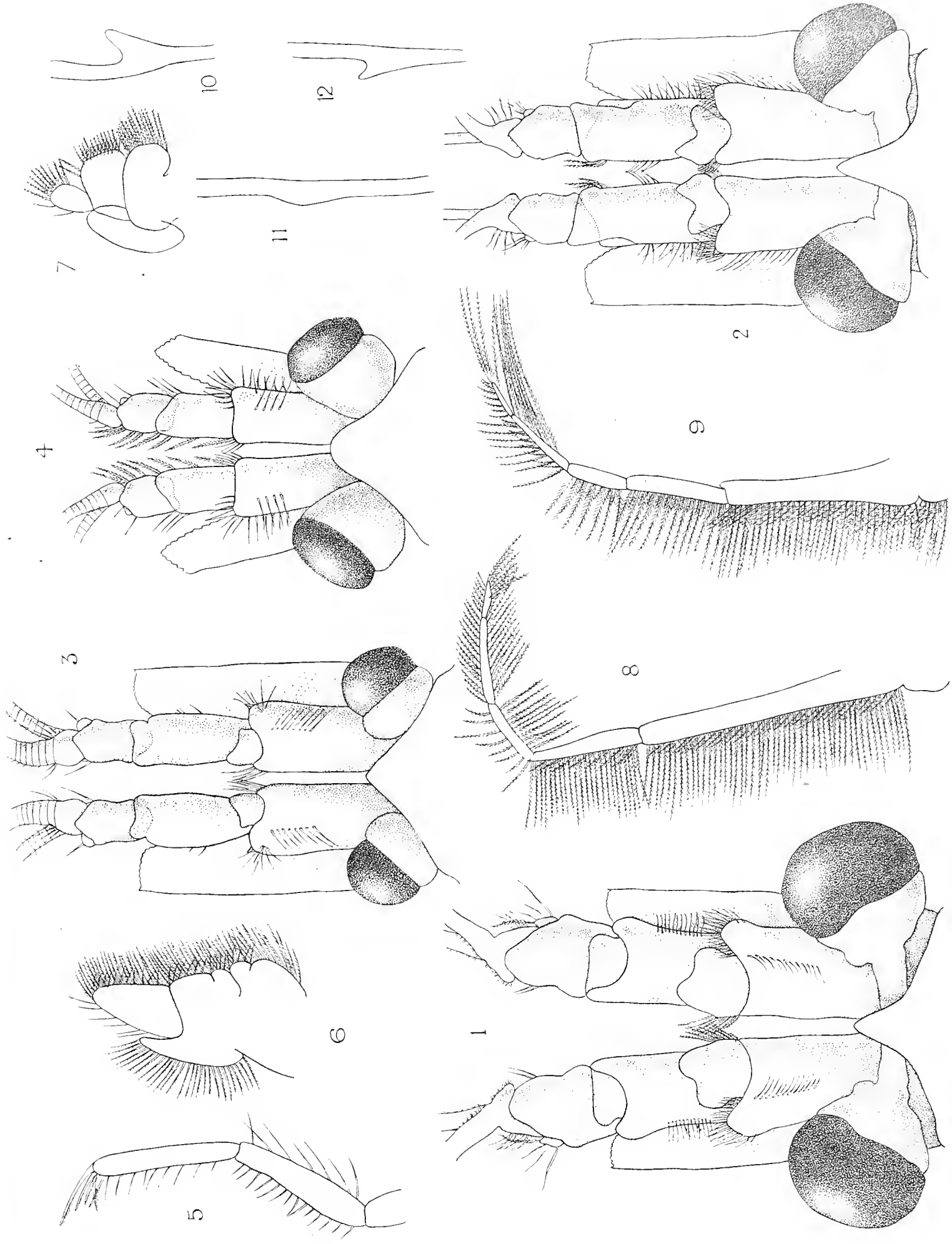
- FIG. 1.—Immature male, dorsal view $\times 6$.

Antarctomysis sp.

- FIG. 2.—Mandible $\times 20$.
 FIG. 3.—Mandibular palp $\times 20$.
 FIG. 4.—First maxilla $\times 20$.
 FIG. 5.—Second maxilla $\times 20$.
 FIG. 6.—First thoracic limb, endopod $\times 8$.
 FIG. 7.—Second thoracic limb, endopod $\times 8$.
 FIG. 8.—Third thoracic limb $\times 8$.
 FIG. 9.—Second pleopod of the male (immature) $\times 15$.
 FIG. 10.—Third pleopod of the male (immature) $\times 15$.
 FIG. 11.—Fourth pleopod of the male (immature) $\times 15$.
 FIG. 12.—Fifth pleopod of the male (immature) $\times 15$.

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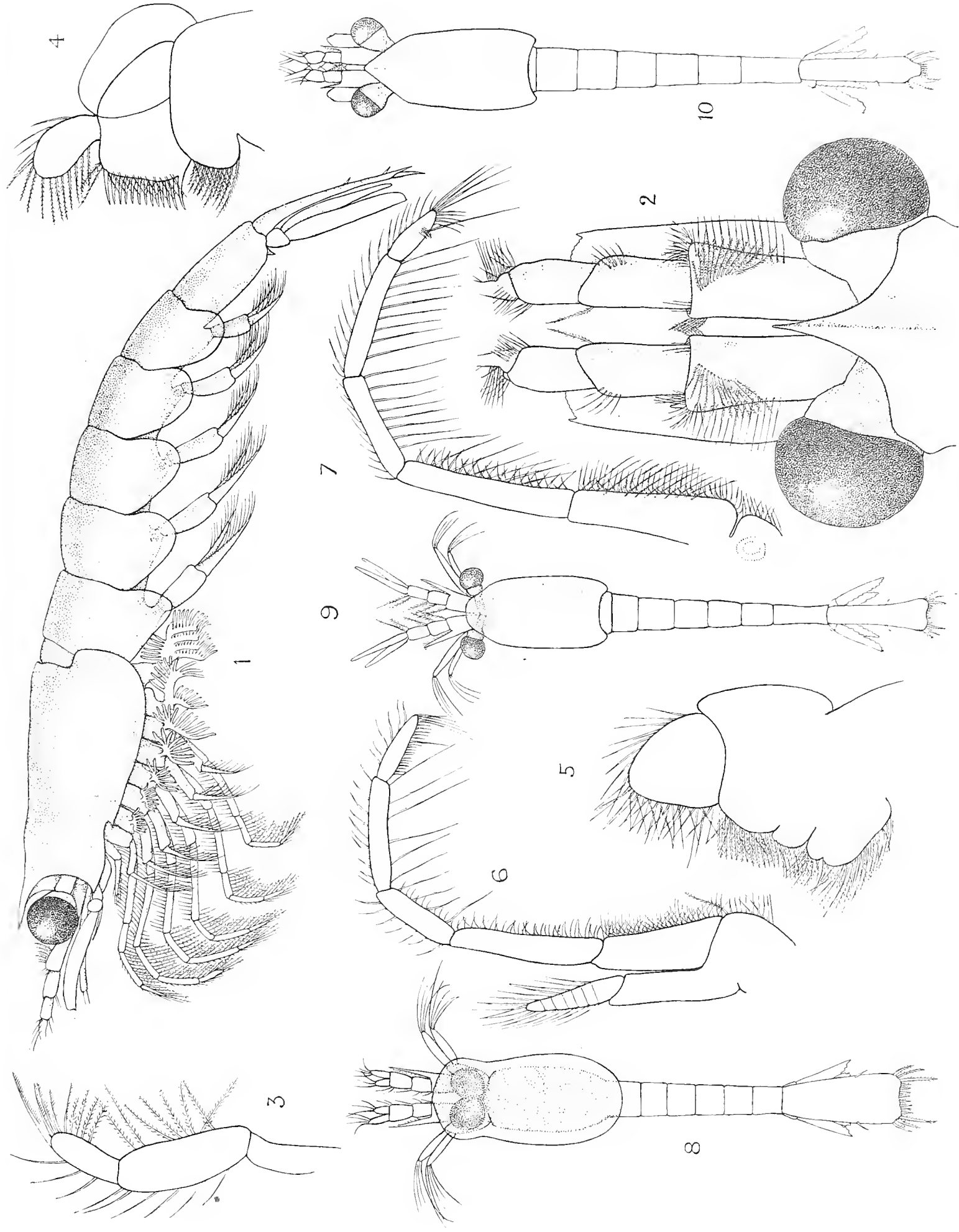


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Butterworth sc

Euphausia superba.







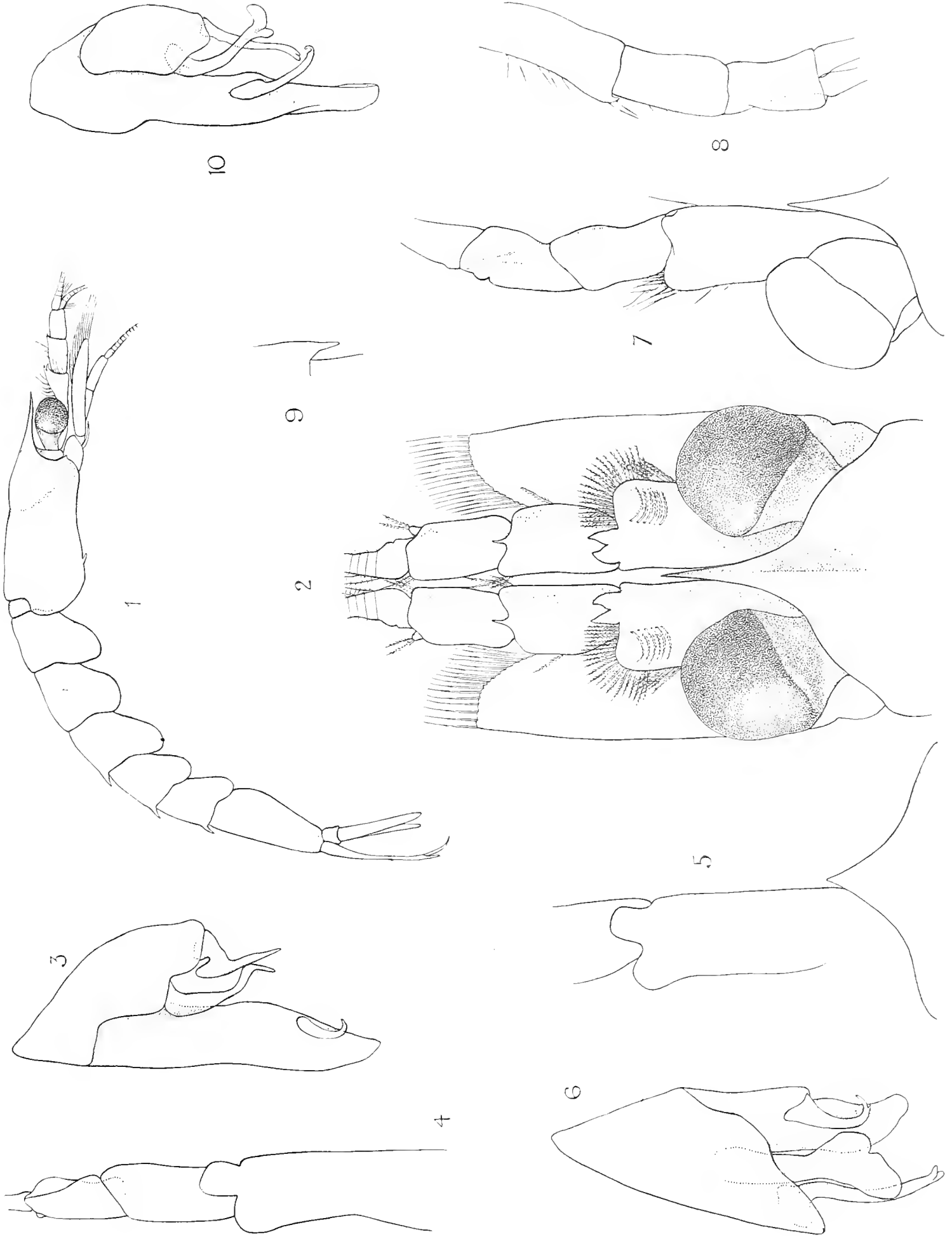


W.M.T. } del
C.M.W. }

Thysanoessa macrura

Futterworth



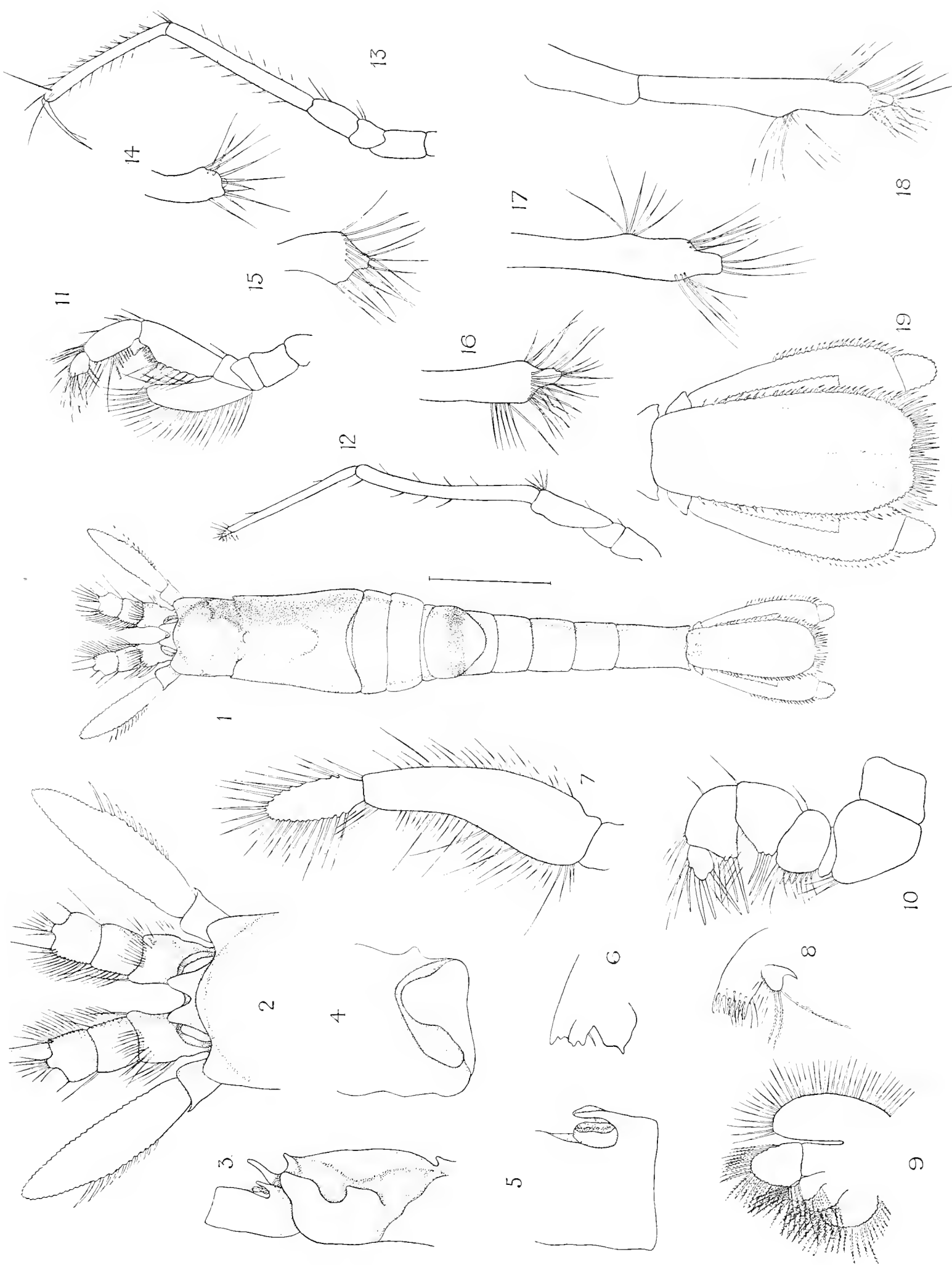


W.M.L. } aol.
G.M.W. }

Butterworth sc

Figs. 1—3. *Euphausia triacantha*. Figs. 4—6. *Euphausia vallentini*.
Figs. 7—9. *Euphausia* sp. juv. Fig. 10. *Euphausia crystallorophias*.



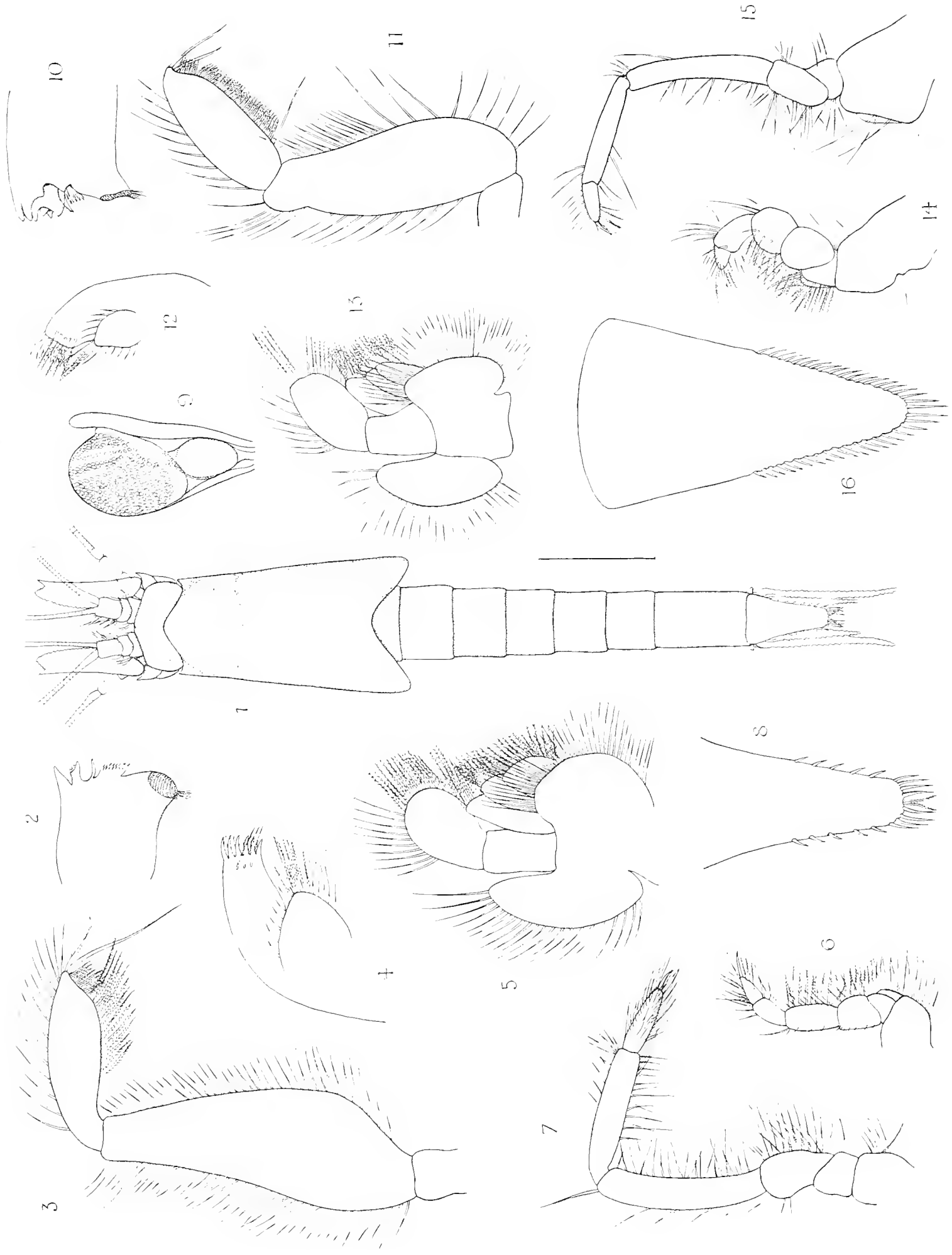


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G.M.W. }

Hansenomysis antarctica.

Butterworth sc.





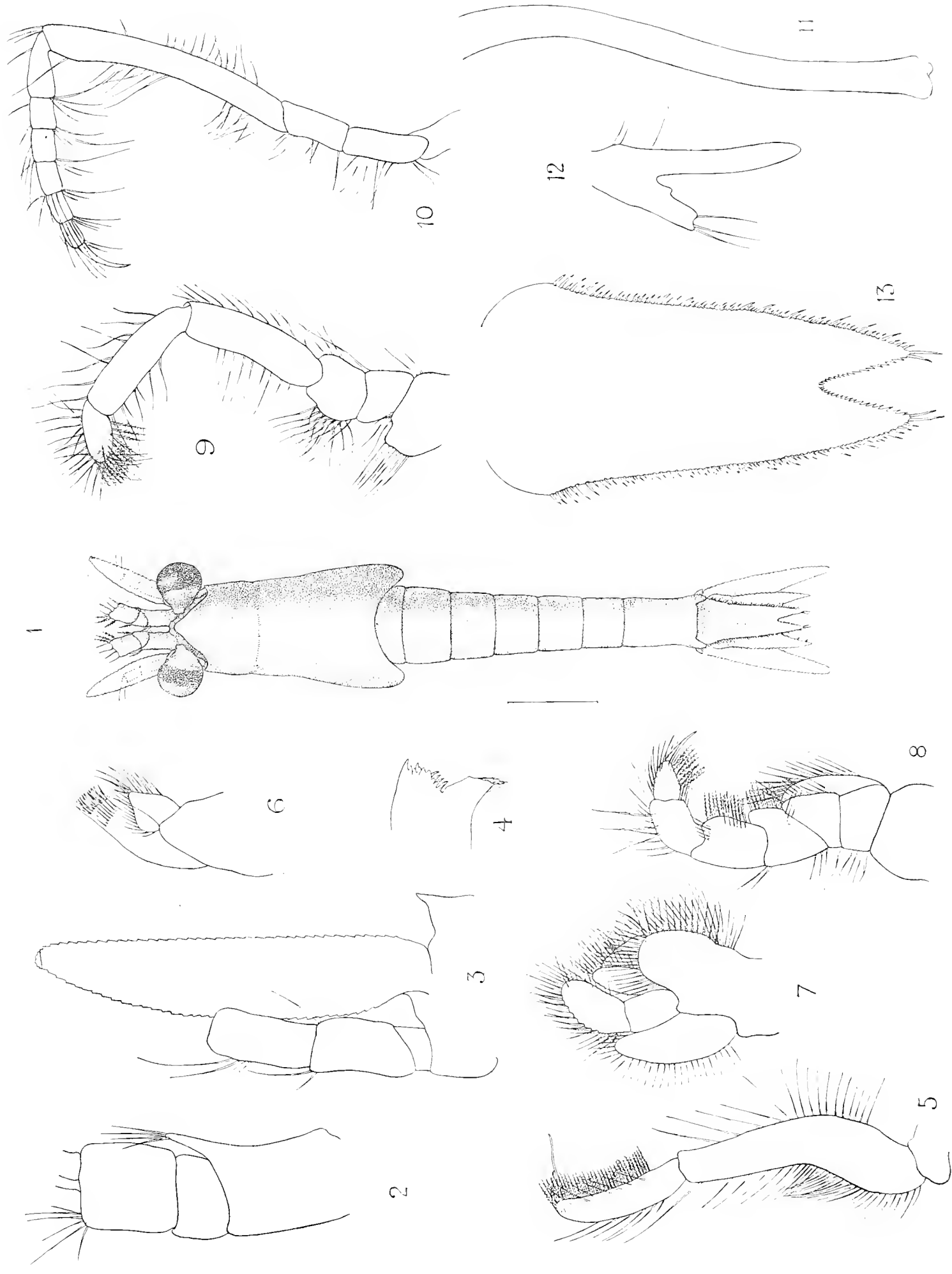
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Farrerworth, sc

Figs. 1-8. *Pseudomma belgicae*.

Figs. 9-16. *Dactylamblyops hodgsoni*.

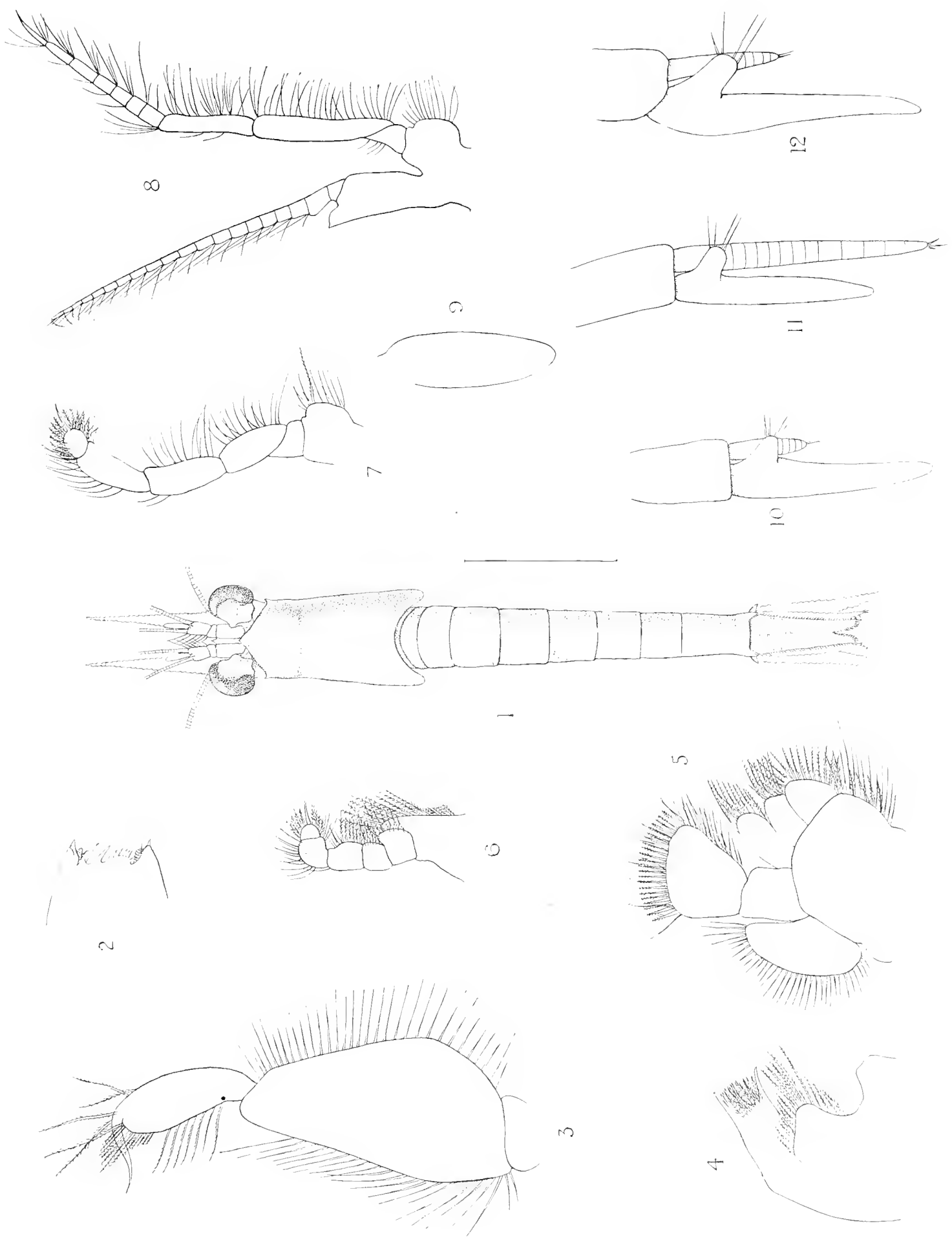




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" M.W. }

Rufenworth sc.





W.M.C. } acf
G.M.W. }

Batterworth sc

Fig. 1. *Antaretomysis maxima*.

Figs. 2-12. *Antaretomysis* sp.





CRUSTACEA.

VIII.—COPEPODA.*

BY R. NORRIS WOLFENDEN, M.D. (Cantab.), F.L.S., F.Z.S.

(7 Plates.)

PREFATORY NOTE.

THE collection handed to me for examination and report thereon was contained in 163 bottles, the contents of a few of which were in such bad preservation that they were practically worthless for the purpose of identification. The collection of individual species is not a large one, though there were great quantities of the more common species. But few absolutely new forms were found; these comprised a new genus (*Paralabidocera*) and seven new species (*Euchaeta similis*, *Stephus antarcticum*, *Xanthocalanus antarcticus* and *X. magnus*, *Haloptilus ocellatus*, *Faroella antarctica*, and *Gaetanus antarcticus*). As such of these copepods as may be considered Antarctic were collected within a small area, I have not deemed it necessary to occupy space by the repetition of individual captures, which would be monotonous and of no particular interest. The drawings have been made by Miss Marion Lees.

The signs used in the following pages are *B* 1 and *B* 2 for first and second basals; *Ri* and *Re* for endopodite and exopodite; *Si* for inner marginal and *Se* for outer marginal spine (or bristle); *Li* for inner and *Le* for outer lobe; *Th* for thoracic somite. As they were first used in Giesbrecht's great work, and have been subsequently often employed by others as abbreviations, the author has thought no excuse necessary for their use here, in order to avoid the constant repetition of the words "exopodite" and "endopodite," etc.

I.

UNTIL the expedition of the 'Belgica' there existed no records of the collection of Copepoda south of Kerguelen, except those of Dr. Brady, which referred to the 'Challenger' collections made from the south of Kerguelen to the pack-ice at 66° 29' S.

The collections made by the 'Discovery,' the 'Belgica,' and the 'Gauss' form a most important contribution to the planktonology of this southern region, and the

* Owing to the author's absence from England he was unable to see the "revise" of this Report.—ED.

results of any one expedition cannot properly be appreciated without reference to the others.

The 'Belgica' collections were made S. and S.E. of Peter I. Island, between $69^{\circ} 48'$ and $71^{\circ} 18'$ S., and $81^{\circ} 19'$ and $92^{\circ} 22'$ W., between April 21st and December 6th, 1898, by means of nets lowered through holes in the pack-ice to a depth of 0-500 mètres.

The 'Discovery' collections were made by lowering and raising a vertically actuated net through holes cut in the ice, while the ship was in Winter Quarters.*

The 'Gauss' collections were made from the South of Kerguelen to the winter station in Gauss Bay, Kaiser Wilhelm II. Land, and were of very extensive character, and as the collections were further made throughout the Atlantic traverse of the ship, they afford an opportunity for the comparison of the purely Antarctic fauna with that of the Southern Ocean.

In considering the question of the distribution of the Copepoda of the southernmost area of the Atlantic (the Antarctic region) it is convenient to consider the results of these expeditions together, since any conclusions drawn from the results of the 'Discovery' alone would be incomplete and even misleading. The 'Belgica' collections have been reported upon by Dr. Giesbrecht ("Résultats du Voyage du S.Y. 'Belgica' en 1897-1898-1899"; Rapports Scientifiques, 1902), and the 'Gauss' collections are still under examination, and I only now refer to the results of my examination of that collection in so far as they assist the elucidation of the 'Discovery' results.

From the results of the three expeditions ('North American,' 'Challenger' and 'Vettor Pisani') which, previously to the 'Belgica,' had collected in the Southern Ocean as far south as the pack-ice, Giesbrecht accepts seventeen species as correct, after rejecting a number of species as "ungenügend beschriebenen und nicht zuverlässig genug bestimmten"),† viz., *Actidius armatus* (50° S.), *Calanus finmarchicus* (52°), *Calanus patagoniensis* (47°), *C. propinquus* ($64^{\circ} 37'$), *simillimus* (52°), *Centropages brachiatus* (52°), *Clausocalanus arcuicornis* (53°), *Clytemnestra scutellata* (46°), *Drepanopus forcipatus* (53°), *D. pectinatus* ($49^{\circ} 16'$), *Metridia boeckii* (45°),

* Mr. Hodgson has supplied me with the following.—Ed.

•• TOW-NETTING IN WINTER QUARTERS.

"After the surface of the sea was frozen over there was no means of dragging a tow-net through the water, and as the current seemed sufficiently strong to hold the net out, it was attached to a line about a fathom above a heavy sinker, 28 lbs., and lowered to a depth of ten fathoms, except in special instances or during the summer. This depth was decided on, it having been found that the formation of ice crystals on the nets could be avoided. These crystals formed on the lines down to 5-8 fathoms, according to the season. The nets remained down for twenty-four hours, sometimes longer if the holes could not be visited on account of the weather, or opened on account of some difficulty with the ice. The mouth of the net was always in an approximately vertical position, this was secured by the attachment of the line direct to the ring of the net and the sinker to the other side of the ring."

† The rejected species are, *Acartia denticornis* (52°), *Candacia curta* (50°) and *truncata* ($64^{\circ} 37'$), *Eucalanus attenuatus* ($47^{\circ} 25'$), *Eucheta marina* ($47^{\circ} 25'$), *Haloptilus aculeatus* ($46^{\circ} 46'$), *Heterorhabdus spinifrons* (50°), *Lucicutia flavicornis* ($47^{\circ} 25'$), *Pleuromamma abdominale* ($65^{\circ} 42'$), *Copilia styliifera* ($66^{\circ} 29'$).—Giesbrecht, 'Belgica' report, p. 5.

Monstrilla grandis (49°), *Oithona similis* (52°), *Paracalanus parvus* (52°), *Rhincalanus nasutus* (52°), *R. gigas* (65° 42'), *Scolecithrix minor* (46° 46').

This list contains a striking number of forms which are usually associated with more temperate regions, and, as Dr. Giesbrecht remarks, the failure in agreement with the pelagic species of the 'Belgica' is very striking, for only two species are common to all collections. Comparing it with the results of the 'Discovery' the same extraordinary differences are manifest, only four species (*C. propinquus*, *C. simillimus*, *Clausocalanus arcuicornis*, *Oithona similis*) being common to both collections.

In the 'Gauss' collections, in the area between Kerguelen and the Winter Station, appear a great number of species in excess of those either of the 'Belgica' or 'Discovery.' Whereas in the 'Belgica' collection occur thirty species, of which nineteen only are pelagic, in the 'Discovery' collection are twenty-four species of pelagic Copepoda; but in the 'Gauss' collection this number is more than doubled, and a number of species occur even in the collections made round about the Winter Station which are not entirely Antarctic, but extend a long way northwards through the deeper waters of the Atlantic Ocean, and have been brought there probably by southern currents. The species determined, however, show but little agreement with the list enumerated above.

The very extensive number of species captured by the 'Gauss' naturalists is probably due to the fact that the tow-nets were used at much greater depths than in the case of either the 'Belgica' or 'Discovery.' In the former, 500 mètres appears to have been the limit, whereas in the latter the collections may be considered to be practically surface collections. If the tow-net had been used at the depths it was employed on the 'Gauss,' viz., to 3,000 mètres, the agreement between the respective captures might certainly have been greater, and the number of species taken greatly increased.

In the 'Gauss' collections appear only six species which agree with any of the species referred to above (viz., *Aetideus armatus*, *Calanus propinquus* and *C. simillimus*, *Clausocalanus arcuicornis*, *Oithona similis*, *Lucicutia flavicornis*), and when it is remembered that in the 'Belgica' collection there are only two species, and in the 'Discovery' only four species, of the twenty-seven species enumerated by Giesbrecht which are in agreement, the conclusion is inevitable either that the captures made by the expeditions mentioned were unusual, or that the identification of species has in some instances been erroneous. That unusual species do appear in these areas, even close to the ice, is shown by the occurrence in the 'Gauss' Antarctic collections of *Corycaeus speciosus*, *Sapphirina metallina*, *Aetideus armatus*, *Labidocera acutifrons*, *Undeuchaeta major*, *Arietellus setosus*, and others; and in the 'Discovery' collection in Lat. 56° 31' S., Long. 156° 19' 30" occurred *Eucalanus subtenis*, and in Lat. 49° 40' S., and Long. 172° 18' 30" W., *Pleuromamma gracilis*, several young *Candace*, *Euchaeta marina*, and *Centropages violaceus*, which belong undoubtedly to a subtropical or warm temperate area, and are to be regarded as accidental.

While the number of species captured was in each case comparatively small, the number of individuals in any one haul in the case of the 'Discovery' was very great. The rule which appears to hold good for tow-netting in the north part of the North Atlantic, *viz.*, that the further north we go the smaller the number of species, but the immensely increased preponderance of individuals of certain species, certainly holds good as regards the South Polar regions. Immense numbers of the small copepod *Ctenocalanus vanus* appear in some of the hauls, to the almost entire exclusion of any other species, and in other cases the larger copepod *Euchaeta antarctica* appears in great preponderance. *Calanus acutus* and, to a lesser extent, *Calanus propinquus* also preponderate largely. Similarly, *Metridia gerlachei* appears in most of the captures.

The collections of the 'Gauss' provide information which is not given by those of the 'Discovery' or of the 'Belgica,' namely, that several species which appear in the Southern Polar Sea also occur in the deeper water of the Atlantic Ocean to the northwards of the Antarctic area. But as this properly belongs to the report of the 'Gauss' collections which I have in hand, I forbear its discussion in this place.

Two questions are suggested by Dr. Giesbrecht in his 'Belgica' report, *viz.*, (1) Does the Antarctic area possess a peculiar fauna? (2) Is the small agreement of the Antarctic copepod fauna with that of the nearest seas due to defective research, or is it that the area of the pack-ice has its own peculiar fauna? and the further questions as to whether the admixture of Polar and Antarctic fauna occurs in the deep ocean, or whether there are physical and biogenetic conditions in the Polar regions which differ from those in the warm seas and prevent such exchange of species, receive some elucidation from the collections of the 'Gauss.'

With regard to the first question, *viz.*, Does the Antarctic area possess its own peculiar fauna? it must be remarked that from the results of the three collections named the typical copepod fauna (pelagic) of this region consists in the following:—

<i>Calanus acutus</i>	<i>Oncea curvata, similis, frigida, notopus,</i>
„ <i>simillimus</i>	<i>conifera</i>
„ <i>propinquus</i>	<i>Scolecithrix glacialis</i>
<i>Rhincalanus grandis</i>	<i>Oithona similis</i>
<i>Euchaeta antarctica</i>	„ <i>frigida</i>
„ <i>austrina</i>	<i>Gaetanus antarcticus</i>
„ <i>similis</i>	<i>Haloptilus ocellatus</i>
<i>Ctenocalanus vanus</i>	<i>Paralabidocera hodgsoni</i>
<i>Heterorhabdus austrinus</i>	<i>Stephus longipes</i>
<i>Euchirella magna</i>	„ <i>antarcticum</i>
<i>Spinocalanus antarcticus</i>	<i>Ectinosoma antarcticum</i>
<i>Metridia gerlachei</i>	<i>Microcalanus pusillus</i>

1. Of the Antarctic Copepoda the following are new species and genera :—

<i>Paralabidocera hodgsoni</i>	<i>Euchirella magna</i>
<i>Haloptilus ocellatus</i>	<i>Faroella antarctica</i>
<i>Stephos antarcticus</i>	<i>Gaetanus antarcticus</i>
<i>Euchaeta similis</i>	<i>Xanthocalanus antarcticus</i>
<i>Calanus simillimus</i> (mentioned briefly by Giesbrecht, <i>loc. cit.</i>).	

2. The following are species newly described by Dr. Giesbrecht ('Belgica' report), occurring also in the 'Discovery' collection :—

<i>Euchaeta antarctica</i>	
<i>Stephus longipes</i>	
<i>Metridia gerlachei</i> (nearly related to <i>M. boeckii</i> and <i>M. lucens</i>).	
<i>Oncea curvata</i> „ „	<i>O. subtilis</i> , Giesb.
<i>Rhincalanus grandis</i> „ „	<i>R. gigas</i> , Brady.
<i>Harpacticus furcifer</i> „ „	<i>H. flexus</i> , Brady.

3. Of species which occur in the North Polar regions there are only the following 'Discovery' species, which bear such slight modification as to be practically identical : *Microcalanus pusillus* (= *Pseudocalanus pygmaeus*); *Oithona similis*.

4. The 'Discovery' collection would therefore lead us to suppose that, so far as copepod fauna is concerned, there is little resemblance between the characteristic fauna of both Polar regions. In the 'Belgica' collection, *Oncea conifera* and *notopus*; and in the 'Gauss' collection, *Oncea conifera*, *Gaidius tenuispinus* and *brevispinus*, and *Amallophora magna*, that is, seven species of a total of 55–60 species occurring in the South Polar seas, are all that are identical with the species described by Prof. Sars as collected by Nansen's Norwegian North Polar Expedition. It would not, however, be safe to take this list of Prof. Sars' as the ultimate result of copepod research of the North Polar seas, and other species may yet be found to be identical.

The following table shows the comparative relationship of species of the more frequently occurring genera :—

N. Polar.		S. Polar.
<i>Calanus finmarchicus</i>	replaced by	<i>C. propinquus</i>
„ <i>hyperboreus</i>		„ <i>lonsus</i>
		„ <i>simillimus</i>
		„ <i>acutus</i>
<i>Metridia longa</i>	replaced by	<i>M. gerlachei</i>
		„ <i>princeps</i>
<i>Amallophora magna</i> (= <i>Scapho-</i> <i>calanus acrocephalus</i> , Sars)		<i>A. magna</i>
<i>Scolecithrix brevicornis</i>	replaced by	<i>S. glacialis</i>
<i>Xanthocalanus borealis</i>	replaced by	<i>X. magnus</i>
		„ <i>antarcticus</i>

N. Polar.		S. Polar.
<i>Gaidius tenuispinus</i>	replaced by	<i>G. tenuispinus</i>
„ <i>brevispinus</i>		„ <i>major</i>
		„ <i>antarcticus</i>
<i>Microcalanus pusillus</i> (= <i>Pseudo-</i> <i>calanus pygmaeus</i>)		<i>M. pusillus</i>
<i>Heterorhabdus norvegicus</i>	replaced by	<i>H. austrinus</i>
„ <i>compactus</i>		„ <i>longicornis</i>
<i>Euchata norvegica</i>	replaced by	<i>E. antarctica</i>
„ <i>glacialis</i>		„ <i>austrina</i>
„ <i>barbata</i>		„ <i>similis</i>
<i>Haloptilus spinifrons</i>	replaced by	<i>H. ocellatus</i>
		„ <i>spiniceps</i>
<i>Spinocalanus longicornis</i>	replaced by	<i>S. antarcticus</i>
<i>Undeuchata spectabilis</i>	replaced by	<i>U. major</i>
<i>Oithona similis</i>	replaced by	<i>O. similis</i>
„ <i>helgolandica</i>		„ <i>curvata</i>
„ <i>conifera</i>		„ <i>conifera</i>
„ <i>notopus</i>		„ <i>notopus</i>
		„ <i>frigida</i>

Suess

Lilljörna

In the North Polar Sea, as Prof. Sars remarks, besides the few distinctly Arctic species are many which extend southwards to the warmer seas, and the North Polar basin copepod fauna has a pronounced resemblance to that of the North Atlantic basin, the greater number of species being common to both, and some deep-water forms of the Norwegian Sea are often surface forms in the North Polar basin. A few forms regarded as quite southern also occur in the North Polar Sea.

So far as the distribution can be followed from the 'Gauss' collections, it may be said that, of the typical Antarctic fauna its representatives diminish gradually to latitude 40° S. (*i.e.* about the latitude of St. Paul and New Amsterdam) north of which they do not appear, but extend westwards to those stations situated directly south and westward to 10° E. as a limit of the Cape of Good Hope, north of which no typically Antarctic species appears.

North of Kerguelen, *i.e.* 50° S. lat., no Antarctic species appear to extend, while the typically subtropical species of the Indian Ocean extend as far south as latitude 30° S., where their southern extension appears to be arrested. There is thus a barrier between lat. 40° and 50° S. and between long. 10° and 80° E. as indicated by the 'Gauss' collections, at which extension northwards of Antarctic species and southwards of Indian Ocean subtropical species is prevented, or at any rate, does not occur. While the same collections indicate that the Antarctic species extend northwards into the Atlantic Ocean in gradually diminishing numbers, only as far as lat. 40° S., north of which they do not occur, a few typically Atlantic deep-water species find their way into the Antarctic Sea (such are *Heterorhabdus profundus*, *Labidocera acutifrons*, *Metridia princeps*, *Lucicutia grandis*, *Gaidius major*, *Arietellus setosus*).

Until the 'Gauss' collections are fully examined it is of course rash to say that no

typically Antarctic species ever find their way northwards by way of the deep Atlantic trough, but there is little evidence of it in the many collections made by the 'Gauss' throughout its Atlantic traverse. A certain number of species which are ubiquitous, such as *Oithona similis*, some species of *Oncea*, *Haloptilus longicornis*, *Gaidius tenuispinus* and *major*, and *Gaetanus* (*armiger*, and possibly *caudani*), extend from the Faroe Channel to the southern ocean; but so far as the evidence at present goes, the Antarctic Copepod fauna is distinct from that of the Arctic seas, and the species which are typical of this region, and most numerous, do not extend far into the Southern Atlantic. As no observations have been made of the Copepod fauna of the deep water of the Indian Ocean, it is quite possible that Antarctic species may bear a considerable extension northwards in this direction.

It is curious that no great number of *Harpacticidæ* appear in the collections of the 'Discovery,' only three examples all told of *Harpacticus furcifer*, which is somewhat different from any *Harpacticus* of the northern hemisphere; and only five are described from the 'Belgica' collection by Dr. Giesbrecht, two of which (*H. brevicornis*, *H. chelifer*), are identical with northern species. A fair number of species occur in the 'Gauss' collection, but these have not yet been examined.

The paucity in numbers of the *Harpacticidæ* in the 'Discovery' captures is no doubt due to the mode of collection.

II.

LIST OF COPEPODS IN THE 'DISCOVERY' COLLECTION.

✓ <i>Euchaeta antarctica.</i>	<i>Microcalanus pusillus.</i>
✓ „ <i>similis.</i> ✓	<i>Stephus longipes.</i>
✓ <i>Metridia gerlachei.</i> ✓	✓ „ <i>antarcticum.</i>
„ <i>princeps.</i> ✓	<i>Xanthocalanus antarcticus.</i> ✓
✓ <i>Calanus acutus.</i>	„ <i>magnus.</i> ✓
✓ „ <i>propinquus.</i> ✓	✓ <i>Paralabidocera hodysoni.</i>
„ <i>tonsus.</i> ✓	✓ <i>Rhincalanus grandis</i>
✓ „ <i>simillimus.</i> ✓	✓ <i>Clausocalanus arcuicornis.</i>
<i>Otenocalanus vanus.</i>	<i>Haloptilus ocellatus.</i>
<i>Oithona similis.</i>	<i>Faroella antarctica.</i>
„ <i>frigida.</i> ✓	<i>Gaetanus antarcticus.</i>
✓ <i>Oncea curvata.</i> ✓	<i>Heterorhabdus longicornis.</i> ✓
	<i>Harpacticus furcifer.</i> ✓

CALANUS (LEACH).

The species first described by Brady as *Calanus propinquus* has been subsequently described by Giesbrecht, who now concludes ('Belgica' report, p. 16) that the copepod described by himself in 1892 as *C. propinquus* from the S.W. Atlantic, between 37° and 52° S., is not this species, but one closely resembling it, to which he gives the name

C. simillimus. Giesbrecht also suggests that the similarity between the two species leads to the doubt whether *C. propinquus* has such a wide distribution as Brady imagined. This author gave it a distribution throughout all oceans—in the southern Indian, north in the Pacific (to 35° N.), and in the Atlantic to 30° N.*

I have made a careful examination of dissected specimens from the following localities :

Lat. 56° 31' S. Long. 156° 19' 30" E.
 Lat. 59° 19' S. Long. 124° 24' 30" W. (28. vi. 04).
 Lat. 84° 01' S. Long. 170° 49' E.
 Lat. 58° 49' 45" S. Long. 154° 48' W. (24. vi. 04).
 Lat. 50° 48' S. Long. 170° 2' E.

and in these hauls occur many examples of a *Calanus* which answers in all particulars to Giesbrecht's *C. simillimus*. As these have well-developed genital segments, in some cases with spermatophores attached, and differ from *C. propinquus* not only in size, being very much smaller than this species, but also in the proportions of the third and fourth pairs of feet, and the serration and proportions of the fifth pair, there is no doubt that this entirely agrees with the animal briefly described by Giesbrecht ; and I think he is correct in regarding it as a species different from *C. propinquus*, and that the distribution of the latter is not so extensive as was imagined by Brady. I therefore describe *C. simillimus* (Giesbrecht) as a different species.

A third species of *Calanus* which does not agree with either of these, being altogether less robust than *C. propinquus*, and constantly much smaller, but at the same time larger than *simillimus*, but with the basals of the fifth pair without any marginal teeth, and the distal margins of the basals of the second to fourth pairs with a row of spines, may probably be *C. tonsus* (Brady), but the description given by this author is of the briefest character, and he gives only two figures, which do not assist in the identification. However, I attach to it Brady's name, as it is probably the animal meant by Brady.

Four species of *Calanus* are found in the 'Discovery' collection :—

1. *Cal. propinquus* (Brady).
2. *Cal. acutus* (Giesbrecht).
3. *Cal. simillimus* (Giesbrecht).
4. *Cal. tonsus* (Brady).

* Lat. 46° 46' S. Long. 45° 31' E.
 Lat. 64° 37' S. Long. 85° 49' E.
 Lat. 47° 25' S. Long. 130° 12' E.
 Lat. 35° 41' N. Long. 157° 42' E.
 Lat. 40° 3' S. Long. 132° 58' W.
 Lat. 9° 43' S. Long. 13° 51' W.
 Lat. 3° 10' N. Long. 14° 51' W.
 Lat. 37° 17' S. Long. 53° 52' W.
 Off Kerguelen Island. Brady, *loc. cit.*

1. CALANUS PROPINQUUS.

(Plate I., figs. 1, 2, 3, 3^a, 4.)

- Calanus propinquus*, Brady, Rep. 'Challenger' XIX., Copepoda (1883), p. 34.
 „ Giesbrecht, Fauna u. Fl. Neap. XIX. (1892), p. 91.
 „ Giesbrecht und Schmeil, Das Tierreich, Copepoda (1898), p. 15.
 „ Giesbrecht, 'Belgica' Report, p. 16.
 „ T. Scott, Trans. Linn. Soc. VI. (1893), p. 25.

The length of this copepod given by Brady is 5.5 mm., by Giesbrecht 4.9–5.3 mm. The majority of the 'Discovery' and 'Gauss' specimens measure under 5 mm. The cephalothorax is rather over three times as long as the abdomen, furcal segments twice as long as broad. Head evenly rounded, without any trace of crest. Head separate from first thoracic segment. Last thoracic segment laterally produced a little, and ending in short points. Anterior antennæ not reaching beyond the furca (thus shorter than described by Giesbrecht, in these specimens). Relative proportions of 24th to 25th segments as 18 : 21.

Second feet <i>Re</i> 3 divided into proximal portion 24 ; distal 25.				
Third	„	„	„	20 ; „ 23.
Fourth	„	„	„	36 : „ 20.

Ri 3 with seven bristles, end saw two-thirds the length of *Re* 3. Fifth feet, *B* 1 with inner margin convex below, concave distally, with thirteen or fourteen teeth, and distally with three teeth, larger than the others. *Ri* 3 with five bristles, two outer, two apical, one inner. This animal is much more robust than the next species (*simillimus*).

The ♂ is about the same size as the ♀, and the chief differences consist in the structure of the fifth feet and shape of the head and thorax. The latter is very like *C. finmarchicus*, the head oval, rounded, and produced, the first thoracic segment with deep indentation between it and the second, and its posterior margin protruded. The anterior antennæ with the basal joints much coalesced. Posterior footjaw with a long, stout, densely-feathered dorsal bristle. Fifth left foot much prolonged, *Re* 1 and 2 elongated, *Re* 3 very short and pyriform shape, with short distal bristle. *Ri* only half the length of *Re*, with respectively 1 : 1 : 6 short weak bristles. Right foot *Ri* nearly as long as *Re*, with 1 : 1 : 6 bristles. *Re* not much more than half as long as *Re* of opposite side. First basal with inner margin armed with seventeen to twenty large teeth ; in its upper part slightly concave, in its lower part slightly convex, the teeth all of pretty much the same size.

2. CALANUS ACUTUS.

(Plate I., figs. 9, 10.)

Calanus acutus, Giesbrecht, 'Belgica' Report,* p. 17.

This copepod was first described by Giesbrecht from the Belgian South Polar Expedition, and in the 'Discovery' collection it forms the chief constituent of the South Polar copepod plankton, along with *Euchaeta antarctica*.

The majority of the animals I have met with both in the 'Gauss' and 'Discovery' collections are smaller than the size given by Giesbrecht, *viz.*, 4.7–5.3 mm. But few of our specimens reach 5 mm. length, the majority being from 4.5–4.7 mm. The cephalothorax is not quite four times as long as the abdomen, the head divided from the first thoracic segment, the last segment of the latter produced laterally, but with evenly rounded margins and no points. In lateral aspect the head is slightly produced forwards, and more inclined to be oval than rounded. In the dorsal aspect it has a distinct triangular appearance, with slight crest in the mid-line. In its broadest part the thorax is 1.15 mm. broad, that is, three times as long as broad.

The furcal segments are a very little longer than the anal, and nearly twice as long as broad. The anterior antennæ vary in length in different animals, in some being only as long as the furca, in others one or two joints longer, and are distinguished by the comparative length of the last joint, which is about twice as long as the one before it.

In the second feet the *Re* is divided into two portions, proximal = 24; distal = 13.

„ third „ „ „ „ = 29; „ = 15.

„ fourth „ „ „ „ = 15; „ = 15.

The *Ri* 3 has in the second and third feet eight bristles, in the fourth only seven, and in the fifth only four (with no outer marginal bristle). The end saw of the *Re* 3 of the second feet is shorter than the *Re* 3; in the third and fourth pair longer.

The fifth feet are distinguished by the absence of the outer marginal bristle of the *Ri* 3, and the total absence of teeth or hairs on the inner margin of the first basal. All males appeared to be immature.

3. CALANUS SIMILLIMUS.

(Plate I., figs. 5, 6.)

Calanus simillimus, Giesbrecht, 'Belgica' Report, p. 17.

♂ 2.5–2.9 mm.; cephalothorax, 1.9 mm.; abdomen, .6 mm. long.

Head separate from first thoracic segment, evenly rounded, without any trace of crest. Head not quite as long as the rest of the thorax (as 18:21). Last thoracic

* "Belgica Report" is throughout this monograph used to indicate "Résultats du Voyage du S. Y. 'Belgica' en 1897–1898–1899." Rapports Scientifiques. 1902.

segment laterally produced somewhat and ending in short points. Anterior antennæ about as long as the furca, or about one joint longer.

Genital segment as long as the next two. Furca three times as long as broad, and longer than the anal segment.

Second feet, *Re* 3 divided by the marginal spine into two about equal parts.

Third feet, *Ri* 3 with eight bristles (four outer, two apical, two inner), *Re* 3 divided into two parts, of which proximal : distal = 17 : 13.

Fourth feet, *Re* 3 divided by the marginal spine, proximal : distal = 20 : 11.

Ri 3 with seven *Si* (two outer, two apical, three inner), terminal saw of *Re* 3 only three-quarters as long as *Re* 3.

Fifth feet *B* 1 toothed, with fourteen teeth on the rather convex margin, and at the distal end a slight break in the continuity, with three rather larger teeth somewhat hidden, in front view, by the upper teeth of the marginal surface. *Ri* 3 with five bristles (two inner, thin and short, two apical, and three outer). In the second pair the *Ri* reaches about the end of the *Re* 2, in the third pair to the first inner marginal bristle of the exopodite, and in the fourth pair as far as the second inner marginal bristle, in the fifth pair beyond the origin of the first inner marginal bristle. The endopodites are therefore proportionately larger than in *C. tonsus*, and the third segment of the exopodite is not four times as long as broad.

While this species agrees with *C. propinquus* in many particulars, the proportions of the third and fourth feet differ, also the toothing and convex margins of the basals of the fifth feet, and the size. Many of the examples were quite adult females with spermatophore attached, so there can be no question of their being merely undeveloped examples of *C. propinquus*, and, as before mentioned, this species has a considerable area of distribution in the southern oceans.

4. CALANUS TONSUS.

(Plate I., figs. 7, 8.)

Calanus tonsus, Brady, Rep. XIX., 'Chall.' Report, p. 34.

„ „ Scott, Tr. Linn. Soc. VI. (1893), p. 25.

„ „ Giesbrecht, Fauna u. Flora Neap. XIX., p. 92.

„ „ Dahl, Verh. Deutsches Zool. Gesells. IV. (1894), p. 77.

Brady's original description of this species is very incomplete, and he merely states that it is "like *C. finmarchicus* and *propinquus*, except that the anterior antennæ are almost devoid of setæ, except on the three apical joints; the posterior antennæ are like those in *C. propinquus*, the fifth pair without basal teeth, and the first abdominal segment large and tumid. The anterior antennæ are as long as the body ♀ Size 3.6 mm." He gives only two figures—*viz.*, of the anterior antennæ and the abdomen.

Giesbrecht includes it under the "Unbestimmbare species," remarking that the

first character probably results from the bad preservation of the animals; the second is a character of other members of this genus; and the third point is characteristic of *gracilis* and *robustior*.

Scott merely mentions that "the large and tumid first abdominal segment seems to be a fairly good character" (*loc. cit.*). However, this is not a characteristic of this species any more than of *C. robustior*, and the existence of this species up to the present time therefore must be regarded as extremely doubtful. However, the 'Discovery' collections contain several examples of a copepod, which, if it is not Brady's species, answers fairly well to it so far as his description goes.

♀ 3.5–3.6 mm. long (cephalothorax, 2.75; abdomen, .75. Body broadest at the end of the first thoracic segment (1.1 mm. broad). Abdomen short, genital segment broad, and one-third broader than the following segment. Furcal segments not quite twice as long as broad, and nearly twice as long as the anal segment. Head evenly rounded, without trace of crest, separate from the first thoracic segment, last thoracic segment only slightly produced, and with rounded margins. Anterior antennæ only reaching the end of the third abdominal segment, the only long bristles on the twenty-third, twenty-fourth, and twenty-fifth segments, the twenty-fourth joint twice as long as the twenty-fifth. Mouth parts resembling *C. finmarchicus*.

Second feet—second basal with four large spines on the distal margin at the inner side. *Re* 3 divided by the external outer spine into proximal and distal portions respectively as 23:16. *Ri* 3 with eight bristles. The whole endopodite does not reach beyond the distal margin of *Re* 2. *Re* 3 as large as *Re* 1 + *Re* 2.

Third feet—four large spines on *B* 2 distal inner margin, endopodite reaching a little beyond the distal margin of *Re* 2. *Re* 3 divided into proximal part = 32, distal portion = 16. *Ri* 3 with eight bristles.

Fourth feet—*Re* 3 divided into proximal part = 37, distal = 15; apical saw only seven-ninths as long as *Re* 3. *Ri* with seven bristles only (three inner, two outer, two apical). *B* 2 with one or two spines on distal inner margin.

On the second, third, fourth and fifth feet the outer margin of the second basal is distally armed with a spine; in second—fourth, the *Re* 3 = *Re* 1 + 2, and is about three times as long as broad.

Fifth feet—first basal with straight inner margin without teeth or hairs, *B* 2 with five spines on the distal inner surface. *Ri* 3 with six bristles (two inner, two outer, two apical).

The only *Calanus* with which this shows agreement is, possibly, Brady's *C. tonsus*; but Brady's description is so fragmentary that it may well be another species. It occurred in some numbers at Station, 22.11.01, Lat. 56° 31' S., Long. 156° 19' 30". Such males as were observed were all immature.

RHINCALANUS (DANA).

(Plate II., fig. 6.)

Rhinc. grandis, Giesbrecht, 'Belgica' Rep., p. 18.

? *Rh. gigas*, Brady, 'Challenger' Rep. XIX., p. 42.

„ Scott, 19th Rep. Scotch Fishery Board (1901), p. 237.

„ Giesbrecht, Fauna u. Fl. Neap. XIX. (1892), p. 153.

Rh. gigas was described by Brady as distributed over a very wide area between long. $53^{\circ} 32'$ W.— $130^{\circ} 52'$ E. and lat. $36^{\circ} 44'$ S.— $65^{\circ} 42'$ S. Much doubt has been expressed by Giesbrecht as to the validity of this species, and the figures given by Brady of abdomen and of the whole animal are those, in Giesbrecht's opinion, of immature animals, and this author thinks that Brady's figure of the first feet is really of one of the other pairs of feet.

Scott's specimens (Fair Isle and Firth of Forth) are regarded by Giesbrecht as *Rh. nasutus* (*Th.* 3 and 4 with dorsal or with a lateral spine, as in *nasutus*, and a pair of small dorsal points on the genital segment). Möbius's specimen from the north of Scotland is also identical with *nasutus*. *Rh. nasutus* is very common in the Faroe Channel and seas off the north of Scotland, and occurs abundantly in my collections made in these regions and along the Atlantic trough, west of Ireland, and also appears in the 'Gauss' collections as far south as lat. 20° N., while in the same collections *Rh. grandis* (Giesbrecht) appeared. From the remarks of Sars in "Crustacea of Norway," Vol. IV., p. 15, it might be inferred that *Rh. nasutus* is of rare occurrence in the Northern Ocean ("two specimens were taken east of Iceland, one specimen by Hjort between Scotland and Norway, and it has not yet been found in the immediate vicinity of the Norwegian coast.") However I have taken it in abundance on many occasions throughout the Faroe Channel. It is rather important to establish the identity of Brady's *Rh. gigas*, and of two preserved specimens at the British Museum, which I have examined, one measured 5.8 mm. and another 6.0 mm. Both were immature females with four-jointed abdomen, lateral spines on *Th.* 3 (small), and on *Th.* 4 (large), with none on the fifth segment, resembling *Rh. grandis*, one dorsal spine on the first abdominal segment (no dorsal spines on the thoracic segments), and so far as could be seen without dissection, the first feet had an exopodite of two segments only, and the fifth pair consisted each of only one ramus of three segments. These two animals were, of course, very much smaller than described by Brady (8.5–10 mm.) and were undoubtedly immature, and the species may well be identical with young *Rh. grandis* (Giesbrecht).

RHINCALANUS GRANDIS.

Rhincalanus grandis, Giesbrecht, 'Belgica' Rep., p. 18.

♀ 7·2–8·0 mm. Head produced in front, dorsally roughly triangular in shape, with large lateral swellings at the base, rostrum not visible from behind. The cephalothorax is over six times as long as the abdomen, which is composed of three segments. A pair of short spines on the anterior margin of the third thoracic segment, and a pair of strong and longer spines on the fourth segment, differentiate this species from *nasutus*, also the absence of any spines on the abdominal segments. The first pair of feet have the *Ri* and *Re* of only two segments, *Re* three with two marginal spines; other feet (except the fifth) have three-jointed rami.

The fifth pair, of one branch only on each side, with three segments, have on the second segment a long inner marginal bristle, and on the last segment three bristles of nearly equal length, two apical, of which the outer is the thickest and the middle one a little the longest, and one on the inner distal margin. A short spine is present on the outer margin in its upper third. The anterior antennæ are about six joints longer than the furca. Adult males were absent.

These examples are absolutely identical with Giesbrecht's species.

METRIDIA (BOECK).

One of the most remarkable things about Brady's 'Challenger' Copepoda is the omission of mention of any example of this genus from his report. Distributed throughout the Atlantic from the North to the South Pole, and in the Pacific, and throughout the track followed in the Atlantic and Southern Ocean by the 'Challenger,' the absence of mention of any species of this genus is certainly extraordinary. In the northernmost regions *Metridia longa* occurs (Sars, Norwegian North Polar Expedition) throughout the Faroe Channel and the Atlantic trough as far south as Valentia in Ireland; and south of the Wyville Thompson ridge, *M. lucens*, *normani* and *curticauda* (Wolfenden); while south of Lat. 40° and throughout the Atlantic occur *M. curticauda*, *brevicauda*, *princeps* and *venusta*; but south of Kerguelen appears a new and characteristic species, *M. gerlachei*, which replaces all others. This is the representative species of the South Polar seas, and it appears abundantly in the 'Gauss,' 'Discovery,' and 'Belgica' collections, and it is as characteristic of this area as *M. longa* and *lucens* are of the northern cold area. *M. princeps* occurs seldom, and *M. brevicuda* as a straggler, outside its proper area of distribution.

METRIDIA GERLACHEI.

Metridia gerlachei, Giesbrecht, 'Belgica' Report, p. 27.

♀ 3·5–3·8 mm., very variable in size, occasionally a little larger and often smaller, but the average of size of examples in the 'Discovery' and 'Gauss' collections is rather less than that given by Giesbrecht for the 'Belgica' specimens. The cephalothorax is one and a half times as long as the abdomen, head separate from first thoracic segment, last segment with rounded margins. The abdomen has the proportional length of its three segments as 9 (genital) : 6 : 4 (anal), and the furca is one-fifth longer than the anal, and three times as long as broad. It is divided into two portions by the outer marginal bristle, of which the proximal is twice the length of the distal.

The shape of the head and thorax is in this species characteristic, the back being extremely gibbous, and the head with very bold curve, which makes it easily recognisable at sight from any other species of this genus. The anterior antennæ are comparatively short and do not reach beyond the genital openings. The first and second segments are coalesced; the eighth, ninth, tenth, eleventh, have only faint indications of separation; the thirteenth and fourteenth joints are not so clearly divided as the others. There are strong teeth on one, two, three, five, seven (one each), those of the third, fifth, seventh joints the strongest, and directed straight forwards. The æsthetascs are numerous.

The endopodites of the second pair of feet have the usual excavation and hook process on the first segment, but in this species the inner hook is exceedingly strong. In the fourth pair the end saw is only two-fifths of the whole length of the *Re 3* (shorter than in Giesbrecht's examples).

The fifth pair consists on each side of three segments, but the distal segment is more or less completely divided into two, the division however is not complete. The two basal joints are of about the same length and breadth, each as broad as a little over half the length. The third joint, however, is not more than four-fifths as long as the basals, and only half the breadth. The second joint bears one short distal bristle, the last joint one outer marginal bristle in the proximal half, and three distal bristles, of which the innermost is the longest and thickest, the outermost the shortest.

METRIDIA PRINCEPS.

(Plate III., figs. 3, 4, 5.)

Metridia princeps, Giesbrecht, Atti Linc. Rend., Ser. 4, v. 5, p. 24.

„ „ „ Fauna u. Fl. Neap. XIX., p. 340.

„ „ „ Farran, Ann. Rep. Fish. Ireland 1902–03, Pl. II. App. II. (1905).

? *Metridia macrura*, Sars, Bull. du Mus. Oceanog. Monaco, 1905, no. 40, p. 7.

Though only one example of this species occurred in the 'Discovery' collection, it was frequent in the 'Gauss' collection, not only at several Atlantic stations, but also

at the southernmost stations. Northwards it ranges to the west coast of Ireland, and, as has been mentioned, has an extreme southern distribution. Giesbrecht's description was given from only one specimen, and compared with Sars', very briefly described, *M. macrura*.

<i>M. princeps</i> , Giesbrecht.	<i>M. macrura</i> , Sars.
Cephalothorax one and a half times as long as the abdomen	Tail about as long as the anterior division
Anterior antennæ extend beyond the furca	Longer than the body
Short teeth on 1, 2, 4, 5, and 6, the 2nd the longest	Only feeble traces of the strong teeth of <i>princeps</i>
Genital segment longer than both the following	?
Anal segment half as long as the preceding one	?
Furca twice as long as anal, and 5 times as long as broad	About as long as the two preceding segments
Size 8·5 mm.	5th feet like <i>princeps</i> , but less unequal
	Size 10·50 mm.

Of the many examples which have come under my notice I find that the relative sizes of the abdominal segments and furca are subject to some variation, thus :—

1.	G.S.	30.	Ab.	2,	16.	Anal	6.	Furca	28	long,	3	broad.	Size	8·15	mm.
2.	„	28.	„	16.	„	8.	„	25	„	3	„	„	8	mm.	
3.	„	27.	„	16.	„	7.	„	23	„	3	„	„	8	mm.	
4.	„	22.	„	11.	„	4.	„	12	„	2	„	„	6	mm.	

The genital segment is thus always twice as long as the two succeeding segments, the anal is not more than half the preceding segment, the furca is generally longer than the two preceding segments, and usually from seven to nine times longer than broad. The teeth on the antennæ are weak, and entirely resemble the figure given by Giesbrecht in Plate 33, fig. 3 (*op. cit.*).

It is difficult to resist the conclusion that these are one and the same species, and not two different species. The male was not described by either Giesbrecht or Sars, but I have met with several examples.

♀. The largest adults were from 8–9 mm. in length.

The body is very transparent, the head evenly rounded, cephalothorax (4·15–4·5 mm. long, abdomen 4·0 mm. long), only slightly longer than the whole abdomen, and a little over one-third as long as broad.

The genital segment is larger than the next two, the anal not more than half as long as the preceding, often much more than the combined length of the two preceding segments and 6–9 times as long as broad, and divided into two portions by the marginal bristle, of which the proximal is to the distal as 8:5. The right furcal segment is sometimes a little longer than the left. Anterior antennæ at least three joints longer than the furca, the basal joints broad, with short teeth on the basal seven joints, of which those on the first two joints are the largest. The

distal joints taper and are very slender. Proportional length of joints of anterior antennæ :—

1 & 2	3	4	5	6	7	8 & 9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
12	4	5	5	5	5	14	6	9	9	12	12	13	13	14	14	15	10	9	10	10	7	3

The eighth and ninth joints are quite coalesced, but in some there is a weak line of division.

The second pair of feet have each the characteristic hooks on *Ri* 1, and the outer one is the longest. The surface of the second basal is beset with short spines, but not the *Re* 1. The third feet are normal and with shortened end saw. The fifth pair each consist of four segments, of which the basal is greater than the second, this longer than the third, and third longer than the fourth and terminal segment. The first joint has on its surface a considerable bunch of long stiff hairs (as in *princeps*), the second joint has a long stiff feathered bristle on the outer distal margin, and the third joint has a short upright spine on the outer distal margin, in all specimens (not on the inner side as figured by Giesbrecht), and the end joint has three rather long fine bristles, of which the innermost is the longest. The spine on the third joint was in one example replaced by two very short spinules on the right foot, while none were present on the left side.

♂ 5·8–6 mm. long (cephalothorax 3·25 mm. Abdomen 2·3 mm. long).

Relative lengths of the abdominal segments = 14, 10, 10, 4, and the furcal segments 13. The left furcal segment is a little the largest and thickest, and six times as long as broad, and three times as long as the short anal segment.

The anterior antennæ extend for about three joints beyond the furca, as in the female, and the left one is a clasping organ with weak joint between the seventeenth and eighteenth segments. The segment beyond the elbow is very long and thin, and as long as the next two distal joints. There are four joints beyond the elbow. The conjoined first and second (basal) joints have two strong teeth, the distal one the largest and curved slightly forwards. The fourth joint has a smaller tooth. Fifth feet: The right foot with very long first joint, the second short, but with very strong, broad-based curved and long hook, the third joint nearly twice as long as the second, and the fourth and end joint a long simple spoon-process twice as long as the third. In the left foot the first joint is very small, the second nearly twice as long, the third a short joint, the fourth a very long simple curved spoon-shaped process. On the inner margin (proximal) of the fourth, of the third, and the distal foot of the second are fine hairs. Both feet are of nearly similar length.

EUCHAETA (PHILIPPI).

Two representatives of this genus appear in the 'Discovery' collections—*E. antarctica*, and another which appears to have constant differences, and to which I have attached the name *E. similis*. I do not in this collection find any example of

Giesbrecht's species *E. austrina*, though I have found it in the 'Gauss' collections. *E. antarctica* appears in many stages, extensive captures consisted wholly of immature specimens, but there are many adult examples. Many males appear amongst these, and while the females are very distinctively different, I am not able to discriminate between those males, as to which definitely belong to *antarctica*, and others which might belong to *similis*. Both species are very closely allied, and differ very considerably from the large species of the northern cold seas, *viz.*, *norvegica*, *glucialis* and *barbata*.

EUCHAETA ANTARCTICA.

(Plate IV., figs. 5, 6.)

Euchaeta antarctica, Giesbrecht, 'Belgica' Report, p. 21.

This is one of the most abundant copepods in the 'Discovery' collection, appearing in all stages of growth, and in some samples almost to the exclusion of other species.

Size of adult examples 7.6 mm.—8 mm. Head evenly rounded, without frontal prominence and with short rostrum directed forwards. Last thoracic segment with rounded margins, produced forwards and with a bunch of hairs on each side. The abdominal segments have the postero-distal margins armed with rather strong bluntly conical and striated teeth, and the two middle segments have on the ventral side bunches of long hairs. The furca and bristles are the same as in *E. similis*. The genital protuberance occupies the lower half of the segment, its upper margin is not deeply concave like *similis*, but the whole swelling is directed downwards, and its upper margin is slightly convex. Above the genital swelling is a secondary prominence, which in the ventral aspect is seen to consist of two valve-like chitin thickenings. The lower part of the protuberance has two lateral lobes, the upper are small, and above this a prominent horn directed straight forwards and never absent in adult specimens of *E. antarctica*, making it quite characteristic of the species.

In the ventral aspect the appearance is quite different from that of *similis*. The genital opening is oval, almost round, with lateral cushions, and above the upper edge of the genital opening guarded by a chitin ridge, is the horn.

The whole swelling is quite symmetrical, rather conical, and occupies quite the lower part of the segment.

The first pair of feet have the outer margin very concave above and very convex below, with a bunch of hairs on the *Re* 1, and a long seta. The seta of *Re* 2 is also very long and thin. The *Re* 3 is only half the length of the coalesced *Re* 1 and 2.

In the second pair the *Re* 1 has a very short *Se*, that of *Re* 2 is very long and more than twice as long as the *Se* 1 of *Re* 3.

In *Re* 3, the *Se* 1 does not reach the origin of *Se* 2, the *Se* 2 does not quite reach the end of the segment, and is three times as long as *Se* 3 and twice as long as *Se* 1. The *Se* 1 and 2 are very greatly curved and almost sickle-shaped.

In the fourth pair the *Re* 3 is not three times as long as broad (16:6). The anterior antennæ are a little longer than the cephalothorax.

The ♂ is a little smaller than the ♀, and presents the same sexual differences as in other *Euchaetae*. The bunches of hairs on the last thoracic segment, so prominent in the ♀, are absent in the ♂.

The first feet have a three-jointed exopodite, the outer margin of which is not so concavo-convex as in the ♀, and its *Se* are short.

In the second pair, the *Se* of the exopodite are also smaller, the *Se* of *Re* 2 only reaching the origin of the *Se* 1 of *Re* 3; the *Se* 2 of *Re* 3 being little more than half the length of the distal part of the segment. The fifth feet are characteristic. The penultimate segment of the left foot is prolonged on the upper margin into a strongly toothed process, and has a setose conical unhaired process on the distal margin, the last segment into a long process, narrow and with a strong bunch of hairs at the distal extremity, and with a large conical and strongly haired process. (This process is sometimes nearly as long as the principal process of the penultimate joint.)

The first basal is short, the second basal long, and with very small and rudimentary endopodite.

The right foot has short first basal, very broad second basal, long first and second *Re* (which are coalesced), and with the last segment blunt and rounded.

EUCHAETA SIMILIS.

(Plate IV., figs. 1, 2, 3, 4.)

This species occurs plentifully in the same samples in which *E. antarctica* is present. For a long time I regarded them as merely different stages in the history of the same animal, but the careful examination of a great number of individuals from different tow-nettings proves the constancy of the points of difference between the two, and as many of the *E. antarctica* and *E. similis* have spermatophores or egg sacs attached, I have come to the conclusion that, though so very similar in most characters, the two species must be separated on account of the invariably different characters of the abdomen and genital segment.

E. similis is constantly rather larger than *E. antarctica*, 8.6 mm.—8.8 mm., and more robust, the head flat and rostrum small, but strong and directed forwards and rather upwards. The cephalothorax is two and a half times as long as the abdomen. The last thoracic segment is produced forwards, slightly triangular shaped, with evenly rounded margin, no spine, but a bunch of long hairs on each side. The abdominal segments, of which the genital is twice as long as the next, are covered with fine hairs, nowhere with large bunches, and the posterior distal margins have only very small teeth, not large, as in *antarctica*. Furca with, on each side, a very short dorsal bristle, the ventral accessory bristle not geniculated at the base, though bent outwards, its length not more than about half of the two long tail bristles (next to the innermost).

Genital segment with very prominent genital tubercle, occupying half the segment, (the lower half only), directed slightly upwards in lateral aspect, with apparently three lobes, an upper and lower, each large with small middle lobe, and without any eminence on the upper part (of the ventral surface) of the segment as in *antarctica*, and also invariably without the ventral horn which is so characteristic of *antarctica*. In the ventral aspect the genital tubercle appears to be obliquely placed, directed downwards towards the left, the vulva guarded by two prominent flaps of which the right one is below the left one. The whole tubercle occupies more of the left than the right side of the segment, which in the dorsal view is only slightly swollen at each side.

The first and second pairs of feet and the number of bristles on the maxilla are the same as in *antarctica*.

While the female is so distinctly different from that of *E. antarctica* I am unable to find similar distinction in the males. Both kinds appear frequently to occur together in the same sample, and all the males appear to be alike.

ONCEA (GIESBRECHT).

ONCEA CURVATA.

Oncea curvata, Giesbrecht, 'Belgica' Report, p. 42.

According to Giesbrecht, this species differs from *O. subtilis* in the following points: Length, 0.6–0.8 mm., the body lengthened, the three segments posterior to the genital are about as long as broad, and comparatively longer than in any other *Oncea* species except *subtilis* (in which they are longer than broad), all three segments together are shorter than the genital (in *subtilis*, the genital segment is only a little longer than the two succeeding segments), the furca is as long or a little longer than the anal segment (in *subtilis* shorter). The posterior antennæ in both kinds are similar, the maxillipedes, however, differ; the terminal hook which, in *subtilis*, is thin and unarmed, is strong and beset with pretty long teeth on the concave side, in *curvata*. The swimming feet are similar in both species, except that in *curvata* the proximal outer marginal bristle on *Ri* 3 occurs in all four pairs, while it is absent in *subtilis*, and the lancet-shaped apical bristle of the fourth foot is in *curvata* longer than in *subtilis*.

The few examples that occur in the 'Discovery' collections are smaller than Giesbrecht's examples, none being more than .56 mm. in total length (♀s with egg sacs attached).

The genital segment is a little longer than the next three segments, the furcal and anal segments of the same length, the second abdominal segment as long as broad, and rather larger than the third segment, the relative lengths of Ab. 2 : 3 : 4 and furca being as 4 : 3 : 4 : 4, the latter nearly three times as long as broad.

In the posterior antennæ, the first basal joint is the largest, and the inner margin of the second basal has a few fine teeth; the distal segment has three proximal bristles

of unequal length, the middle one very short, and distal to it, a comparatively long and slightly armed bristle, terminally four long and two shorter bristles.

The maxillipede is armed with a strong claw bristle, denticulated on the inner margin, and the second basal has two comparatively stout bristles, the proximal of which is armed with wide-apart bristles.

In the fourth pair of feet the apical bristle of the exopodite is longer than the third exopodite segment by one-third of its length.

The agreement, therefore, between this species and Giesbrecht's examples is very close, the only difference being one of size, and there is no doubt that the two species are identical.

STEPHUS.*

Möbianus, Giesbrecht, Fauna u. Fl. Neap. XIX. (1892), p. 205.

Stephos, Th. Scott, 10th Rep. Scotch Fishery Board, Vol. X. (1892), p. 245.

Stephus = *Stephos*, Giesbrecht, 'Belgica' Rep., p. 20.

Stephos, Sars, "Crustacea of Norway," Vol. IV. (1903), p. 61.

Since Giesbrecht described the genus *Möbianus*, which was subsequently identified with *Stephos* (Scott), several other examples of the same genus have been described. Scott himself recorded three specimens, viz., *S. minor*, *S. fultoni*, and *S. gyrans*, supposing the latter to be identical with Giesbrecht's *Möbianus gyrans*.

Sars has described two new species from Norway, viz., *S. lamellatus* and *Scotti*, which latter is again identical with *Stephos gyrans* Scott (not Giesbrecht). Giesbrecht's species (*gyrans*) is said by Sars to differ in the asymmetrical last thoracic segment and genital segment, the latter with "a number of irregularly arranged spiniform processes not found in any of the northern species," the last feet of the male also differing from *S. scotti*.

The 'Belgica' report contains yet another species described by Giesbrecht as Antarctic, viz., *S. longipes*. This species recurs also in both the 'Gauss' and 'Discovery' collections, and in the latter I find a further and considerably larger example, to which I have given the name *antarcticum*.

As these descriptions are scattered over six different volumes, I think it may be of service to bring them together here.

1. S. GYRANS.

S. gyrans, Giesbrecht, Fauna u. Fl. Neap. XIX. (1892), p. 205; Giesbrecht, u. Schmeil, Das Tierreich, Copep., p. 29.

Furca longer than broad, anterior antennæ reaching to end of genital segment, genital segment with a curved hook on ventral side, shorter hook on dorsal, fifth feet

* The author, in agreement with Sars, prefers the name originally given to the genus by Scott, but it is perhaps better to observe the ordinary rule.—ED.

in female, end segment rather curved and broad basally ; in male, left foot with several long appendages, right foot, thin appendages at end and rest foliate ; size = 0·8–1 mm. (Naples.)

2. *S. SCOTTI*.

S. gyrons, Scott, Nineteenth Rep. Scotch Fishery Board (1901), p. 237.

S. scotti, Sars, "Crustacea of Norway," Vol. IV., p. 63.

Slender ; cephalothorax symmetrical ; genital segment without spines, furca longer than broad, anterior antennæ reach end of abdomen 2, *Re* of posterior antennæ twice as long as *Ri*. ♀, fifth, with denticles on last segment, which is elongated and pointed ; ♂, fifth, penultimate joint of left foot tumefied, last segment with about half a dozen short processes ; last joint of right foot with long, sickle-shaped process. Size = 0·85–0·95 mm. (Loch Fyne ; Norway.)

3. *S. MINUS*.

S. minor, Scott, Tenth Rep. Scotch Fishery Board, 1892, p. 245.

Robust, cephalothorax symmetrical ; genital segment without spines, anterior antennæ about as long as the thorax, furca as long as broad, fifth feet in ♀ with elongated last segment with two little lateral spinules ; in ♂, right foot a long foliate joint at end, left foot with two digitiform processes at end, penultimate joint only slightly tumefied. Size = 0·74 mm. (Firth of Forth.)

4. *S. LAMELLATUM*.

S. lamellatus, Sars, "Crustacea of Norway," Vol. IV., p. 62.

Short and robust, last segment asymmetrical ; right side longest, genital segment unsymmetrical and rounded prominence on right side, but no spines ; furca about as long as broad, anterior antennæ reach to furca, branches of posterior antennæ equal ; fifth foot in ♀, last joint elongated, with fine spine midway ; in ♂, left foot with much tumefied penultimate segment, with proximally a long spine, and last joint with a number (about nine) of leaf-like appendages ; right foot not foliate, but last joint with three or four short, rounded appendages. Size = 1 mm. (Norway.)

5. *S. FULTONI*.

S. fultoni, Scott, Ann. and Mag. Nat. Hist., 7th series, Vol. I. (1898), p. 185.

Cephalothorax symmetrical ; genital segment with spine and hook ventrally. Fifth feet in ♀ are larger and broader (knife-like) than the other, which is pointed ; in ♂ right foot with elongated penultimate segment and short, strong, foliate end segment ; left foot, penultimate segment tumefied, extremity with five or six leaf appendages, and bifid claw. Size = 1 mm. (Clyde.)

6. *S. LONGIPES.*

S. longipes, Giesbrecht, 'Belgica' Rep., p. 20.

Cephalothorax symmetrical; genital segment swollen laterally and roughly triangular-shaped, anterior antennæ not reaching end of thorax, no spines on genital segment; fifth feet in ♀ last segment elongated, curved (foliate), with external spine half as long as in ♂; right foot with two middle segments very elongated, ending distally in curved hook not articulating; left foot without tumefied segment, two middle elongated, last shorter with knob and spine, but no processes. Size .8–.9 m. (Antarctic). ('Discovery' and 'Gauss' collections. Wolfenden.)

7. *S. ANTARCTICUM.*

Robust, cephalothorax a little unsymmetrical, right side prolonged; genital segment swollen laterally, with bunch of spine-like bristles each side; furca as broad as long; anterior antennæ reach to Ab. 2; *Re* of posterior antennæ longer than *Ri*. Fifth feet in ♀ right side longest, each with three end spines, innermost hook-like; in ♂, right with third joint elongated and club-shaped distally, with a large, roughly triangular plate, and last joint a strong, curved hook; left foot, no tumefied segment, and last joint with distally a short-stalked haired knob, no appendages. Size = 1.75–2 mm. ('Discovery' collection.)

STEPHUS LONGIPES.

(Plate V., figs. 1, 2, 3.)

Stephus longipes, Giesbrecht. 'Belgica' Rep., p. 20.

♀ .75–.80 mm. ♂ .65–.70 mm. Cephalothorax rather more than twice as long as the abdomen; head separated from first thoracic segment, but all segments very difficult to determine, owing to the indistinctness of the lines. Last thoracic segment with rounded margins and symmetrical. Abdomen in the female four, in the male five segments, furcal segments only as long as the anal, as broad as long, and with rounded margins, each with four tail bristles and a short fifth inner marginal bristle. Genital segment in the female as long as the next two, laterally with roughly triangular swellings, and in its greatest breadth, broader than long. Anterior antennæ not as long as the thorax, and of twenty-three joints, the first, second, eighth and ninth coalesced, with few bristles, the longest on the seventh and eighteenth joints, but well supplied with long aesthetascs.

Posterior antennæ with exopodite about one-third longer than the endopodite. Posterior foot-jaw with rather thick first basal and *B* 1 : *B* 2 : *Ri* as 8 : 7 : 6; mandibles with broad-ended masticatory plate, one pointed outer tooth, with considerable space between it and the middle stout comparatively broad teeth, and three pointed inner teeth.

First feet $Ri=1$, $Re=3$; no Se on Re 1, and very short Se on Re 2.

Second feet $Ri=2$, $Re=3$.

Third and fourth feet Ri and $Re=3$.

Fifth, each of three segments, two basal, each short and comparatively thick, terminal segment longer and thinner, prolonged, with a stout curved hook with short bristles on the upper margin and an external marginal thin and short bristle.

The male is rather smaller than the female, the abdomen has five segments, the mouth organs are as in the female, but the fifth feet are transformed into clasping organs, that of the right side of four segments, the left of five. The second and third segments of the left are elongated, the distal segment short and broadened out, the distal extremity ending in a spine, and at the opposite side a short knob process, apparently without marginal hairs.

The right foot with short broad second basal, and two distal very elongated and thin segments, with a long thin sickle-shaped process at the end, which appears to be a continuation only of the joint above it, and though forming an elbow, does not articulate.

In the general structure this small Copepod bears great resemblance to the species *Stephus antarcticum*, which, however, is twice as large; the fifth feet in the female as well as the male are different, and the two species are therefore quite distinct.

STEPHUS ANTARCTICUM.

(Plate V., figs. 4, 5, 6, 7, 8.)

♀ 1.85–2.0 mm. long, cephalothorax about three times as long as abdomen, and in its broadest part distal of the middle line one-third as broad as long. Head evenly rounded, a little produced in front, but without trace of rostrum, a weak line indicating its division from the first thoracic segment. Last two segments of the thorax imperfectly divided, and last segment a little unsymmetrical; on the right side a little longer than on the left, produced into a round-ended margin, on the left side more acutely pointed, which is most marked in lateral view. Abdomen of four segments respectively proportioned: genital segment, 2:3 and anal as 20:13:8:8; furcal segments as long as the anal, and as broad as long. Genital segment laterally swollen in the upper part (genital protuberances) and again slightly swollen laterally in its lower part, with on each side a bunch of rather long spines, none dorsally. Furca with four tail setae on each side, outer margins haired and with, on each side, a short lateral spine instead of the usual bristle, and on the ventral side a very short accessory bristle. Of the tail bristles, the two middle ones are much the longest and thickest, and those of the right side more so than those of the left.

Anterior antennae reach in both sexes to about the end of the second abdominal segment, having twenty-four segments, the eighth and ninth coalesced. In the posterior antennae the exopodite is longer than the endopodite. The mandibles with branches

nearly of same length, masticatory plate with strong teeth. The posterior foot jaws with first and second basal and *Ri* in proportion of 24 : 11 : 20 ; maxillæ, *B* 2 with 5 ; *Re* with 10 ; *Ri* 1 with 4, *Ri* 2 with 3, *Ri* 3 with six bristles, *Li* 2 and 3 present, and *Le* 1 with eight bristles.

The first feet have one jointed *Ri* and three jointed *Re*, without *Se* on *Re* 1.

The second feet have two jointed *Ri* and three jointed *Re*.

The third and fourth feet have both rami three-jointed.

Fifth feet comparatively large, that of the right side a little longer than the left. Each of three segments, of which the two basals are equal in size, but the last segment on the right foot is a little longer than in the opposite foot. Each has terminally three spiny processes, the innermost comparatively thick, curved, and hook-like, and with hairs only on the outer margin. The two outer spines are neither much more than half the length of the inner one, and only half as thick.

The ♂ is a little smaller, 1.75 mm., and of slenderer build ; the asymmetry of the last thoracic segment is only slight, and on neither side is it so prolonged as in the female. The abdomen consists of five segments, the first segment is more laterally swollen than in the female, and is broader than long ; the second and third segments about equal in length, and much longer than the anal, which is very short. The antennæ, oral organs, and feet are the same as in the female, with the exception of the fifth pair, which are converted into two extraordinary appendages. Arising from a common basal, the right leg possesses four segments, the left five segments. In the right leg the first joint is short and rather broad, the second elongated, rather longer and thicker than the third, which is a long thin joint with club-shaped distal extremity, and having attached to the joint it makes with the last appendage a broad, rather triangular plate covered with fine hairs and a few rather strong spines. The last joint is represented by a comparatively strong and large curved appendage, armed along its inner margin with short stiff bristles, these two terminal appendages resembling an awkward-looking pair of shears.

The left foot, of five segments, has the first and second comparatively shorter but broader than the third and fourth. The fifth segment short and broad at the distal end, has externally a short curved tooth-like ending of the distal margin, and at the inner end an upright knob-shaped appendage, strongly armed all over, and especially at the base of the stalk, with short stiff bristles.

The fifth feet of the ♂ and ♀ possess no near resemblance to similar organs in any other species of *Stephus* ; the size of the animal, moreover, is comparatively large for any representative of this genus, and it must therefore be regarded as a new species. Several examples occurred in two or three of the 'Discovery' collections.

PARALABIDOCERA.

There is no mention of any example of the genus *Labidocera* in Giesbrecht's 'Belgica' report. In the 'Discovery' collection there are a great number of specimens of an animal superficially resembling *Labidocera*, but which does not agree with any known species of that genus, though bearing some relation to *L. wollastoni*. Between 60° and 70° S. *Labidocera acutifrons* appears in the 'Gauss' collection, but is absent from either the 'Discovery' or 'Belgica' collections, and this genus is thus very sparingly represented in the Antarctic area. The copepod referred to below differs distinctly from any known *Labidocera* in the character of the swimming feet of the female and the five-jointed abdomen of the male, and the fifth pair of feet, and I have thought it better to create a genus for it.

Characters of the genus.—Very similar in appearance to *Labidocera*, but a total absence of "ocelli," and of very unsymmetrical shape, the swimming feet without spines on the last segment of the exopodite, and the male abdomen of five segments.

PARALABIDOCERA HODGSONI.

(Plate VI., figs. 1–13.)

♀ 1.55–2 mm.; ♂ 1.6 mm. long. The head is evenly rounded, produced forwards a little, and in front are two delicate rostral filaments. There is no trace of eyes, either dorsal or ventral, but in some males there are two dark spots laterally on the head, and in a few females a dark pigmented spot on each side, which may possibly have been ocelli. But considering the mode of preservation, which included freezing and thawing, and a long sojourn in spirit, these organs may very well have been present at some time; and subsequently vanished. The head is quite without any trace of side hooks, and separated from the first thoracic segment; last two segments coalesce and produced on each side into lateral expansions, but bluntly ended. Abdomen of three segments, the genital with large lateral outgrowths, and also dorsally and ventrally swollen a little; spines entirely absent; next segment also laterally enlarged, and anal segment small; furcal segments a little unsymmetrical, the right a little longer and broader than the left; all tail bristles comparatively short, consisting of four apical and one lateral marginal (situated a little distal of the middle), all slightly thickened at the base. There is also a small accessory dorsal furcal bristle on each side. Anterior antennæ shorter than the cephalothorax and with only twenty-two distinct joints, very densely covered with long bristles.

PROPORTIONAL LENGTH OF ANTENNAL JOINTS.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
10	10	2	4	1½	1	2	3	3	8	4	4	4	6	6	6	6	7	5	10	6	3½

Posterior antennæ with *Ri* much longer than *Re*, the former with six long bristles on the first segment, and seven and six bristles on the distal segment. *Re* very indistinctly segmented, the proximal joint very elongated.

Mandibles with *Ri* longer than *Re*, *B 2* with one marginal bristle, masticatory plate broad, with one rather large tooth and a good space between it and the next five conical short teeth.

Maxilla with *B 2* and *Ri* bent outwards; *B 2*, *Ri*, and *Re* coalesced and almost indistinguishable; *Li 1* with seven rather long and stout hooks and two shorter bristles; *Li 2* a large lobe with three bristles, *Li 2* with one bristle; *Ri* indistinctly segmented on the outer margin with five apical bristles; *Re* scarcely segmented, with only two bristles; *Le 1* with seven long and very thick bristles, and three shorter bristles.

Anterior foot jaws with lobes much compressed, and terminal five bristles longer than the proximal and also much thicker.

Posterior foot jaw very similar to that of *Anomalocera*. *B 2* is short, but rather thick, and with one short bristle; *Ri* short, unsegmented, with only three terminal and short bristles.

One to four pairs of feet, with *Ri* of only two, *Re* of three segments. In the first pair the external marginal setæ of *Re* are long and thin, in the others the external spines are short, and in all there is only one marginal spine (apical) on *Re 3*.

First pair of feet, *B 1* and *B 2* with only slightly convex inner margin and no *Si*. *Re 1* longer than *Re 2* + *Re 3*, outside margin haired and long marginal bristle. *Re 2* and *Re 3* with similarly long marginal bristles. $Se = 1:1:2$ and $Si = 1:1:5$. *Ri 2* nearly twice as long as *Ri 1* and with 5 *Si*.

In the second pair *B 2* is broader than long, the inner margin convex and without hairs or bristles; *B 1* is also without *Si*. *Ri 1* prolonged, *Ri 2* shorter (as 7:10). *Ri 1* with 2 *Si*, *Ri 2* with 7 *Si*.

$Re 1:2:3$ as 11:6:9, with respectively 1:1:1 *Se*, that of *Re 1* the largest and of *Re 3* the smallest; the end saw about two-thirds as long as the whole *Re*; a small curved spine distal margin of *Re 3* just external to the saw. 5 *Si* on *Re 3*.

3rd feet. *B 1* and *B 2* without bristles or hairs, *Ri* as in the preceding pair, *Re* as in the preceding pair and with 1:1:1 *Se* only.

4th feet. *B 1* and *B 2* as before. *Ri 1* with three *Si*, *Ri 2* with only six *Si*. The three joints of *Re* rather more equal in length, $Se 1:1:1$ as in the other feet. *Ri 1* is more elongated than in the other feet and twice as long as *Ri 2*.

In the second to fourth pairs the *Ri* is more than half as long as the *Re* and extends beyond the distal margin of *Re 2*. In all feet the number of external marginal spines is certainly peculiar, the usual rule being three marginal spines on the *Re 3*, so that the animal differs from any true *Labidocera*.

The 5th feet consist of a common basal and one ramus on each side of two segments *B 2* and *Re*. *Ri* represented only by a spine. The first and second basals are

nearly equal in length and each about as broad as long. The second basal segment has at its distal inner margin a very stout articulating spine, *Ri* four-fifths as broad as this joint is long. On its outer surface, near the distal and outer end, is a delicate bristle. The third segment is nearly twice as long as the second basal, tapers to a point, and just below the distal end is a delicate little bristle. Near the end of the joint and on the inner side is a very stout broad-based spine, not articulating, and nearly half as long as the whole segment. Frequently the foot of one side is a little longer than of the other.

The whole animal is very unsymmetrical, especially in the shape of the last thoracic segment and the genital segment of the abdomen. The characters of the swimming feet, as to proportions, *and especially as to the absence of spines on the last joint of the exopodite*, and the absence of anything like the usual ocelli of *Labidocera*, are points which appear to remove it from that genus. The abdomen of most females is more or less enveloped in a mass of colourless, structureless membrane. The ♂ is distinctly five-jointed in the abdomen, whereas in *Labidocera* this is four-jointed. The right anterior antenna especially also differs from other species. From the characters of the female feet and the abdomen of the males I have thought it justifiable to create a new genus for this animal. I name the species after Mr. Hodgson, the naturalist of the 'Discovery' Expedition.

♂ smaller than the ♀ (1.6 mm). Cephalothorax with head separate from next segment, two dark lateral spots, but not ocelli, in front of the head. Abdomen little more than half as long as the thorax. Head evenly rounded, without side hooks, last thoracic segment rounded and not produced. Abdomen of undoubtedly five segments, of which the second is about as long as the third and fourth together, the first is very short, the fourth is twice as long as the anal, which is a short segment; the furcal segments, of which the right is a little larger than the left, are twice as long as broad and three times the length of the anal segment.

Right anterior antenna a clasping organ, the middle joints swollen, the joint before the elbow with a marginal row of small teeth and with only two distinct segments beyond the elbow, of which the distal is very long and thin (over three times as long as broad), and in its distal part carrying on the inner margin a very long spine tapering to a fine whip-like extremity, but broad in its basal portion. This appendage is half as long again as the whole joint. The joint immediately distal to the elbow has on its margin proximally a short but thick spine. I find it very difficult in any of the specimens, of which there are several, to agree with any degree of accuracy upon the exact number of segments in this antenna owing to the fact of its being curled up in every case. First to fourth feet and mouth organs as in the female.

5th feet, powerful clasping organs, the right one of four segments, the left of three, with a common basal. The first segment of the right foot has on its inner margin a small knob projection, the second has two short, thick spines, the third a fine spine, and the last joint is curved into a strong hook, without any appendages.

The first joint of the left foot has a short spine on the external margin, and the last joint is broad proximally and foliaceous, and on its inner surface is a row of fine bristles, with three or four stiff and longer than the rest.

EUCALANUS (DANA).

That any species of *Eucalanus* should be found at extreme southern latitudes is certainly curious. *E. elongatus* certainly occurs south of lat. 40° , and about 40° W. long., 'Gauss' collection; and in the 'Discovery' collection I have found about half a dozen examples of a *Eucalanus* which I regard as a variety of *E. subtenuis* or *mucronatus*. This occurred at station marked 21. x. 01, lat. $57^{\circ} 25\frac{1}{2}'$ S., long. $151^{\circ} \frac{3}{4}'$ E., and station lat. $56^{\circ} 31'$ S., long. $156^{\circ} 19' 30''$, 22. xi. 01; in both cases a long distance outside the Antarctic Circle.

The ♀ (no males were found) is 4 mm. long. The head is very triangular, elongated, and produced in front into a blunt point slightly bent downwards; there are lateral swellings as in *attenuatus*, the part behind is not, however, indented. The last thoracic segment is rounded. The abdomen has three segments, and one tail bristle on the left side is a little thicker and longer than the rest. The genital segment is laterally swollen and broader than long. Posterior antennæ with first and second joints of the exopodite coalesced, the first joint of the endopodite about three times as long as broad, and about the same length as *Ri* 2. The mandibles with very short *Ri*, the proximal part about three times as long as the distal, the whole *Ri* very much shorter than the distal part of the basal, and with four bristles and two short marginal bristles. Maxilla, *B* 2 with five, *Ri* 1 with four, *Ri* 2 with four, *Ri* 3 with five bristles. With some resemblance to *E. subtenuis*, *pileatus*, and *mucronatus*, it is larger than any of them. The five bristles on the *B* 2 of the maxilla cause it to differ from either *mucronatus* or *subtenuis*, and it has considerable differences from *pileatus* in size, posterior antenna and mandible. The shape of the head is certainly not that of *subtenuis*, nor is it so triangular and pointed as *mucronatus*.

CTENOCALANUS (GIESBRECHT).

CTENOCALANUS VANUS.

Ctenocalanus vanus. Giesbrecht, Atti Acc. Lincei Rend., Ser. 4, 1888, p. 335.

„ „ „ Fauna u. Fl. Neap. XIX. (1892), p. 194.

This is extremely abundant in the 'Discovery' collections, but does not differ in any material particular from the species well known in the Atlantic. Its range of distribution is very great, extending from the Faroe Channel (Wolfenden) throughout the Atlantic to the southernmost parts of the Antarctic area, *i.e.* to the ice region.

CLAUSOCALANUS (GIESBRECHT).

CLAUSOCALANUS ARCUICORNIS.

- Clausocalanus arcuicornis*. Giesbrecht, Atti. Acc. Lincei Rend., Ser. 4., vol. 4, p. 334.
 „ „ Giesbrecht, Fauna u. Fl. Neap. XIX. (1892), p. 50.
 „ „ Giesbrecht u. Schmeil, Das Tierreich, p. 27.

That this species should occur so far south is rather peculiar. It was found in the collections made at :—

Lat. 49° 40' S.	Long. 172° 18' 30" W.
Lat. 55° 44' S.	Long. 95° 43' 30" W.
Lat. 56° 12' 45" S.	Long. 136° 18' 30" W.
Lat. 57° 25½' S.	Long. 151° 43' E.
Lat. 58° 49' 45" S.	Long. 154° 48' W.
Lat. 59° 19' S.	Long. 120° 24' 30" E.
Lat. 63° 5' S.	Long. 175° 43' E.
Lat. 84° 01' S.	Long. 170° 49' E.

and does not differ essentially from the species common in the Atlantic. It has a considerably greater range than was thought, since I can record it from the Irish coast to nearly the Antarctic Circle.

GAETANUS (GIESBRECHT).

GAETANUS ANTARCTICUS.

(Plate III., fig. 6.)

Gaetanus antarcticus, Wolfenden, Plankton Studies, Part I. (1905), p. 7.

Size 8 mm. The body is very robust and dorsally very gibbous. The head and first thoracic segment are coalesced, and together much longer than all the rest. The last thoracic segment carries two short stout curved spines, directed backwards. The head is in its upper part quite square, and with short stout curved spine, directed a little forwards. The abdomen is not a quarter the length of the cephalothorax.

Anterior antennæ not as long as the body, of twenty-three segments, with the eighteenth, nineteenth and twenty-first segments longer than the twentieth, and all joints with very few setæ. *Ri* of the posterior antennæ more than half the length of *Re*. Posterior foot jaws with lamellar process on the first basal.

Maxillæ; *Li* 2 and *Li* 3, each with four bristles; *B* 2 with five, *Ri* small and two-jointed. *Re* small, and less than half the length of *B* 2.

First feet, *Re* of three segments with three marginal spines, the segmentation being complete; *Ri* of only one segment.

Second feet, *Ri* distinctly two-jointed.

Third and fourth feet, *Ri* and *Re* of three joints each. *B* 2 of the fourth feet with tubal bristles as in *Gaidius*.

The extraordinary size of this animal makes it the largest known species of *Gaetanus*. It occurred once only in the 'Discovery' collection, and also appeared in the 'Gauss' collection, and is probably Antarctic in its habitat. Several new species of *Gaetanus* have been described recently, and it may serve some useful purpose to recapitulate here the different species discovered since Giesbrecht and Schmeil's last work (Tierreich, 1898).

1. GAETANUS MAJOR.

G. major, Wolfenden, Proc. Zool. Soc., London, Feb. 3, 1903, in Dr. Fowler's paper.

„ Farran, Ann. Rep. Fish. Ireland, 1902-03, Part II., App. II., 1905.

Size 5 mm. and over. Anterior antennæ larger than the body by about one joint; lamellar appendage of posterior foot jaws absent; *Re* of first feet of three segments, and with three *Se*. Cephalic spine short, and as in *G. armiger*.

2. GAETANUS CAUDANI.

Gaetanus caudani, Canu, Ann. Univ. Lyon, V. 26, 1896.

„ „ Wolfenden, Jour. Mar. Biol. Assoc., 1904, p. 24.

„ (?) *pileatus*, Farran, *ibid.*

Like *G. miles*, but anterior antennæ only one-and-half times as long as the body; lamella of posterior foot jaw like that of *G. miles*. *Re* of first feet, three segmented basals of fourth feet with tubal bristles, 5 mm. and over. Canu's original description was of one immature ♂. Farran's were also immature specimens.

3. GAETANUS HOLTI.

Gaetanus holti, Farran, *ibid.*

„ *latifrons*, Sars, Bull. Mus. Monaco, No. 26, March, 1905.

„ *longispinus*, Wolfenden, Plankton Studies, Part I. (1905), p. 7.

Cephalic spine strong and directed backwards with long interval between the frontal part and base of the horn. Anterior antennæ not as long as the body-spines of the last thoracic segment, strong, long, and directed backwards. Small lamella on posterior foot jaw. First feet with three segments and three *Se*. Fourth feet with basal tubal bristles. Size 4.74 mm.

4. GAETANUS ANTARCTICUS.

Gaetanus antarcticus, Wolfenden, Plankton Studies, Part I. (1905), p. 7.

Thorax gibbous, very stout short curved cephalic spine directed forwards, head square, not like *G. armiger*. Abdomen short and thick, not a quarter of whole length.

Anterior antennæ not as long as the body. Posterior foot jaw with lamella. *Re* of first feet with three segments and three *Se*. Fourth feet with tubal bristles. Size 8 mm.

5. GAETANUS MINOR.

Gaetanus minor, Farran, Ann. Rep. Fish. Ireland, 1902-03, P. II., App. II. (1905), p. 34.

Cephalic spine as in *G. armiger*, long slender spines of last thoracic segment. Anterior antennæ reaching only to genital segment. First feet with *Re* of two segments and only two *Se*. Second feet with one-jointed *Re*. Size 2.4 mm.

6. GAETANUS ROBUSTUS.

Gaetanus robustus, Sars, Bull. Mus. Océanographique Monaco, no. 26 (1905), p. 11.

Robust, cephalothorax a little swollen in middle. Cephalic spine small, curved, or sometimes absent. Spines of last thoracic segment very strong and divergent. Abdomen thick and about one-third of whole length. Anterior antennæ scarcely as long as the body. Size 8 mm. (? possibly the same as *G. antarcticus*, but the description of *G. robustus* is insufficient.)

7. GAETANUS INERMIS.

Gaetanus inermis, Sars, *op. cit.*, p. 12.

Body very thick, anterior division swollen. No trace of cephalic spine, last segment of thorax rounded and without spines. Abdomen very short, not a quarter of whole length. Anterior antennæ not longer than body. Structure of other parts not different from other species of this genus (?) Size 6.30 mm.

(In the absence of cephalic and thoracic spines, which are constant in this genus, this is probably not a *Gaetanus*.)

8. GAETANUS CURVICORNIS.

Gaetanus curvicornis, Sars, *op. cit.*, p. 11.

Body like *G. miles* (Giesbrecht), short curved cephalic spine. Spines of last thoracic segment moderately large and divergent. Very short abdomen only a quarter the whole length. Anterior antennæ scarcely longer than the body. Size 4.35 mm.

9. GAETANUS KRUEPPI.

Gaëtanus kruppi, Giesbrecht, Mitt. Zool. St. zu Neapel, XVI. (1903), p. 202.

Like *G. armiger*, but larger, *viz.*, 3.6-4 mm. long, thorax shorter. Anterior antennæ reach three joints beyond furca, twenty-second segment longer than in *G. armiger*. Feet like *G. miles*. ♂ 3.7 mm. long, thoracic spines shorter than ♀ and antennæ shorter than body. *Se* of *Re* 2 of first foot rudimentary; fourth feet without tubal bristles. Fifth feet *Ri* of one segment, *Re* of right foot of two; of left, of three segments. Mediterranean.

XANTHOCALANUS (GIESBRECHT).

There are only two examples of this genus in the 'Discovery' collection. Since the publication of Giesbrecht and Seimeil's "Copepoda" (in "Tierreich") the genus has received many additional species. To the originally described species, *viz.*, *X. agilis* and *X. minor* (Giesbrecht), are now added *X. borealis* (Sars), *X. propinquus* (Sars), *X. muticus* (Sars), *X. cristatus* (Wolfenden), *X. subcristatus* (Wolfenden), *X. simplex* (Wolfenden), *X. magnus* (Wolfenden), *X. calaminus* (Wolfenden), *X. atlanticus* (Wolfenden), *X. greeni* (Farran), *X. pinguis* (Farran), and *X. obtusus* (Farran); and, as they are described in scattered publications, it may be well to recapitulate the characters here.

1. *X. AGILIS*.

X. agilis, Giesbrecht, Fauna u. Fl. Neap. XIX. (1892), p. 286.

Size 2.4; fureal segments broader than long, abdominal segments very hirsute; anterior antennæ reaching end of furea; fifth feet three segments, beset with spines and teeth, and with three apical teeth.

In the ♂ only one (the left) foot five-jointed. (Mediterranean.)

2. *X. SUBAGILIS*.

X. subagilis, Wolfenden, Jour. Mar. Biol. Assoc., VII. (1904), p. 118.

Size 2.6 mm., resembling *X. agilis*, but abdominal segments not hirsute.

Fifth feet with three segments, the basal with strong teeth, the middle with only hairs, the distal spinulose and with three long apical spines.

♂ with a pair of fifth feet nearly equal, the right of four, the left of five segments. (Mull of Galloway.)

3. *X. BOREALIS*.

X. borealis, Sars, Crustacea of Norway, Vol. IV., p. 46.

Size 3.50 mm.; fureal segments as broad as long, anterior antennæ reach end of genital segment; fifth feet of three segments, proximal two, with teeth on inner margin; last with two apical and two lateral spines.

♂ with a pair of fifth feet left of five segments, right very short and of only three segments. (Polar Seas. Norway.)

4. *X. PROPINQUUS*.

X. propinquus, Sars, *loc. cit.*

Size 1.75 mm.; fureal rami longer than broad; anterior antennæ slender and reaching only to second abdominal segment, posterior antennæ with *Re* much longer

than *Ri*; fifth feet of three segments, last much smaller than proximal two, only basal with marginal teeth, end segment with three short outer and one long inner spine.

♂ a pair of fifth feet, the right very rudimentary and short, of three segments. (Polar Sea. Norway.)

5. X. CRISTATUS.

X. cristatus, Wolfenden, Jour. Mar. Biol. Assoc., 1904, p. 119.

Size 5.0 mm.; head triangular and with prominent crest, anterior antennæ reaching to end of furca; fifth feet of three segments, all densely spinulose, with two short apical spines. ♂ not known. (West of Ireland.)

6. X. SUBCRISTATUS.

X. subcristatus, Wolfenden, Plankton Studies, Part II. (1906), p. 31.

Size 7.0 mm.; head with crest, abdomen very hirsute, furcal segments very short, anterior antennæ reaching end of genital segment; fifth feet three segments, the distal long and tapering, with two short apical spines; all these segments densely spinulose. ♂ not known. (South Polar Sea.)

7. X. MAGNUS.

X. magnus, Wolfenden, *op. cit.*, p. 32.

Size 8.8 mm.; head rounded, not clearly separated from next segment; furcal segments very short, anterior antennæ reaching the genital segment; abdominal segments very hirsute; fifth feet of three segments, very small; all segments very spinulose, with two apical and two lateral spines on the last segment. ♂ not known. (South Polar Sea.)

8. X. SIMPLEX.

X. simplex, Wolfenden, *op. cit.*, p. 30.

Size 1.45 mm.; whole surface of thoracic segments covered with fine prickles, anterior antennæ very short, posterior antennæ with *Re* nearly twice as long as *Ri*; anterior foot jaws with only vermiform processes, posterior foot jaws with long, thin *B2* without bristles; fifth feet very small, of common basal and two segments, the distal one very small, with two apical spines on the left and only one on the right foot. ♂ unknown. (West of Ireland.)

9. X. CALAMINUS.

X. calaminus, Wolfenden, *op. cit.*, p. 34.

Size 5.5 mm.; furcal segments as broad as long, posterior antennæ with rami of equal length; anterior foot jaw with powerful toothed hook on fourth lobe, and two slenderer hooks on fifth lobe; brush and vermiform processes; posterior foot jaw short and stout, the bristles of the endopodite very peculiar and like quills, with broad chitin expansion with serrated edge; fifth feet very small, of three segments; distal segment with short apical and two short marginal spines. (Bay of Biscay.)

10. *X. ATLANTICUS*.

X. atlanticus, Wolfenden, Jour. Mar. Biol. Assoc., April, 1904.

Size 2·5 mm. ; anterior antennæ much shorter than thorax and very thick basally, abdominal segments prickly and hirsute, feet very spinulose ; fifth of three segments, distal the largest, with four large articulating spines, two apical, two lateral ; all segments very spinulose ; furcal rami as broad as long, and *Re* of posterior antennæ much longer than *Ri*. (West of Ireland.)

11. *X. OBTUSUS*.

X. obtusus, Farran, Ann. Rep. Fish., Ireland, 1902-03, pt. ii., App. II. (1905), p. 40.

Size 2·4 mm. Furcal rami little longer than broad, anterior antennæ reach genital segment, feet very spinulose. Fifth feet, three segmented, spinulose, and with two terminal and two lateral spines on last segment ; second joint longest, and spinulose on both margins. (Atlantic. Ireland.)

12. *X. PINGUIS*.

X. pinguis, Farran, Ann. Rep. Fish., Ireland, 1902-03, pt. ii., App. II. (1905), p. 40.

Size 4·5 mm. Head imperfectly separated from thorax ; lateral processes of last segment blunt ; furcal segments slightly longer than broad ; anterior antennæ short, not as long as thorax ; rami of posterior antennæ short and broad ; feet spinulose. Fifth feet of three segments, and two lateral and two apical end spines ; surface of third and margins of first (inner) and second (outer) spinulose. (Atlantic. Ireland.)

13. *X. GREENI*. *X. MUTICUS*.

X. greeni, Farran, Ann. Rep. Fish., Ireland, 1902-03, pt. ii., App. II. (1905), p. 40. *X. muticus*, Sars, Bull. Mus. Monaco.

Size 5·30-6 mm. ; last two segments of thorax united, last segment with obtusely triangular margins ; furcal segments short, broader than long ; anterior antennæ little longer than body. Fifth feet small, two-jointed (Sars), or three-jointed (Farran), without spines on inner margin ; last joint with three small apical spines. (Atlantic. Ireland.)

14. *X. TYPICUS*.

Amallophora typica, Scott, Tr. Linn. Soc. (2), VI. (1894), p. 54.

Only the ♂ known ; 2·7 mm. long ; anterior antennæ, twenty segments ; right fifth foot short and three segments, left like that of *X. agilis*.

XANTHOCALANUS ANTARCTICUS.

(Plate VII., figs. 10, 11.)

♀ 2.5 mm. long (cephalothorax 2.0 mm., abdomen 0.5 mm. long). Abdomen, therefore, only one-fourth as long as the thorax. Head rounded and rather oval in front, with bifid rostrum, composed of two chitinous plates each with a long and rather thick filament. Head separate from first thoracic segment, last two segments separate, and distal segment on each side produced into lappets ending in rather pointed but rounded margins. Furcal segments half as long again as broad. In the middle, the thorax is broad, about half as broad as long. Abdominal segments with row of pectinations laterally, and over whole dorsum at the margin of the very short anal segment. Anterior antennæ twenty-four segments, and short, only reaching to the end of the cephalothorax.

Posterior antennæ with *Re* a little longer than *Ri*.

Mandibles, *Ri* and *Re* about equal; *B 2* with three marginal bristles; *Re* elongated and narrow, with seven bristles. Maxilla, *B 2* and *Ri* elongated and narrow, imperfectly segmented; *B 2* with four, *Ri 1* with 1, *Ri 2* and 3 with six bristles, *Li 1* nearly twice as long as broad, with long, thin hook bristles. Anterior foot jaws with very convex *B 2*, the proximal margin of the basals much embayed. Strong toothed and curved hook on the last lobe; a number of brush processes, with small heads, and two vermiform processes distally.

Posterior foot jaws, having proportionately $B 1 : B 2 : Ri = 40 : 30 : 20$, the second basal about three and a half times as long as broad, and a brush process on the first basal.

1st feet *Ri* = 1 segment. *Re* = 3 segments with three long, thin marginal spines.

2nd feet *Ri* = 2 segments, *Re* = 3 segments. *Ri 2* with a strong corona of spines.

3rd feet with a few delicate spines on surface of *Re 2*.

4th feet *Ri* = 2 segments, *Re* = 3 segments. *Ri 2* with a few spines on the outer margin. The exopodites of the 3rd and 4th feet not spinulose.

5th feet small. A common basal and each three segments; the first segment rather longer and broader than the second, with convex inner margin, and several (about eight or nine) strong teeth on the margin; the second segment with two or three shorter spines on the proximal part of the convex inner margin; the third segment with two short apical, and one outer and one inner marginal spines—four in all—each articulating with the segment, and on the inner margin a bunch of small teeth. A cluster of five spines on the distal surface of the last segment, and two very small spines on the outer margin of the middle segment distally. No spines on the surface of the two proximal joints.

XANTHOCALANUS MAGNUS.

(Plate VII., figs. 1-9.)

Xanthocalanus magnus, Wolfenden, Plankton Studies, Part II. (1906), p. 32.

♀ 6.0 mm. long. Head dorsally with line of separation from the first segment, rounded and without any trace of crest; produced in front into a chitinous lamella with two pointed rami. Last thoracic segment on each side a little produced. Abdomen short, the cephalothorax being three and a half times its length. Genital segment protuberant ventrally and longer than the next two, anal segment very small, and furcal segments much longer than the anal.

Anterior antennæ, reaching about the end of the genital segment, of twenty-four segments, with thick basal joints, the eighth and ninth coalesced, the last segment very small. Posterior antennæ with *Ri* longer than *Re*, the first joint of the latter with strong rounded projection of the lower and inner margin. The masticatory plate of the mandibles with strong teeth, the two outer longer than the inner ones, which are short and all of the same size. Anterior foot jaws short, but strongly built, the outer margin very convex, the last lobe bearing a very strong thick basally and curved sickle-shaped hook, tapering distally; all the bristles of *Ri* represented by sensory brush and vermiform appendages. The posterior foot jaws somewhat extended, the first basal comparatively thick and with a brush appendage, the second basal elongated and thin, with very short marginal bristles; *Ri* also elongated, the first and second joints long, and its bristles comparatively short. Maxillæ very like the preceding species, but *B* 2 with five, *Ri* with ten bristles, *Re* elongated and narrow.

1st feet, *Re* with three distinct segments and three external spines; *Ri* only one segment.

2nd feet, *Re* of three broad segments very spinulose on the surface, and with short external marginal spines, *Ri* of two segments with prominent bunches of spines on the surface of *Ri* 2.

3rd and 4th feet, each ramus of three segments, the surfaces spinulose.

5th feet small, of three segments more or less covered, especially the last segment and margins, with comparatively long, spine-like bristles; the terminal segment with two short terminal and two very short marginal spines, not articulating.

This is an adult female, and resembles the animal I have described as *Xanthocalanus magnus* (Plankton Studies, Feb., 1906) so closely that I think they must be regarded as the same animal. The 'Gauss' animals are, however, very much larger (up to 8.8 mm.), but the only essential differences which I can detect are the much greater size of the latter, the rather more pointed dorsum of the head, and the more hirsute abdominal segments. In these collections I have found many examples which appear to differ only in size, and I am inclined to think that this 'Discovery' example is merely a smaller one of the same species. The 5th pair of feet are strikingly different from the northern species.

HETERORRHABDUS (GIESBRECHT).

Only one specimen of this genus occurs in the 'Discovery' collection, which is only what might be expected from the fact that the collection is practically only epiplanktonic, whereas *Heterorhabdus* is without doubt one of the most confirmed deep-water genera of Copepoda. The species *H. austrina* (Giesbrecht), which occurs in the 'Belgica' and 'Gauss' collections, is absent from those of the 'Discovery,' and the only specimen of the genus occurring in the latter is, I think, referable to *H. longicornis*.

HETERORRHABDUS LONGICORNIS.

- Heterochaeta longicornis*, Giesbrecht. Atti. Acc. Linc. Rend., Ser. 4, v. (1889) p. 811.
 " " " Fauna u. Fl. Neap. XIX. (1892), p. 373.
 " " Wolfenden. Jour. Mar. Biol. Assoc., Vol. VII. (1904) p. 124.
 ? *Heterochaeta major*, Dahl. Verh. d. Zool. Gesells., 1894, p. 79.
Heterorhabdus major, Wolfenden. Plankton Studies, Part I. (1905), p. 11.

I first described the male of *H. longicornis*, hitherto unknown, in 1902. Since then I have found it frequently throughout the Atlantic, extending to the Antarctic area. Dahl's description of *H. major* is very scanty, and the only essential point of difference between it and *longicornis* appears to be one of size. The specimen in the 'Discovery' collection is a ♂ of 4.5 mm. length, but there is no essential difference between it and smaller males from the Faroe Channel. I suggest therefore that Dahl's *H. major* is really *H. longicornis*, and I now think that the species which I described in "Plankton Studies" as *H. major* may best be described as *H. longicornis* (Giesbrecht).

The diagnostic points of *H. major* (Dahl) are, according to this author, "anterior antennæ very long, the posterior foot-jaw with only weak median bristles; the penultimate lobe of the anterior foot-jaw a long 'tap' lobe, the mandible teeth but little differing in thickness, nearly the same distance apart; the exopodite of the third feet like those of the second and fourth, the size over 5 mm. long."

Except as to size, it will be observed that none of these points differ from those of *H. longicornis*, the largest examples of which are not, however, more than 3.5 mm. long in the North Atlantic.

The 'Discovery' specimen is a ♂ of 4.5 mm. length, the anterior antennæ several joints (about six) longer than the whole body; the geniculating antennæ with six joints beyond the elbow. The right furcal segment is much longer than the left. The fifth lobe of the anterior foot-jaw has a very thick-based stout curved hook, without teeth or bristles except for a few bristles at the proximal end; the lobe itself is very large. The two other bristles are long and thin. The sixth lobe has a long and thin hook, also uncombed. The bristles of *Ri* are extremely long. The posterior foot-jaw has a long thin second basal, three times as long as broad, and only two weak bristles in the middle. The mandible has a large simple conical tooth on the outside, and

these outer teeth are not in either mandible thickened. The third feet resemble the fourth. The right fifth foot has a long upright process on *B* 2, haired marginally; the *Re* 2 broad and with a marginal protuberance on which are two or three short teeth and a small bunch of hairs, flattened long spine distal to it. *Re* 3 a long curved spoon-shaped segment, with a stout-based apical spine, shorter spine on the inner aspect; the right *Ri* with the second segment elongated and narrow, the third segment comparatively broad and short, the inner marginal bristle of *Ri* 2 thickened.

The left foot has a haired marginal projection as *B* 2, *Re* 3 with a long stout apical spine, three-quarters as long as the segment, and with a short marginal spine on the inner side, *Ri* 2 broad, with thickened bristle. A specimen of *H. longicornis* from the Faroe Channel measured 3.5 mm. long; Esterly records it from Diego, California, 3 mm. long. The Southern Ocean species evidently reaches a much greater length (4.5 mm.).

FAROELLA (WOLFENDEN).

In the course of my cruising in the Faroe Channel in 1901 I captured a copepod which differed from any known species, to which I originally gave the name *Pseudætideus multiserrata*, in the paper read at the British Association, 1902. In 1903 appeared Sars' supplement, in which he described a new genus, *Ætidiopsis*, which appeared to be the same animal; and as I had already recognised that this copepod was distinctive from others closely allied (*Pseudætideus*, *Chiridius*, *Gaidius*), I had created for it a new genus, *Faroella*. My paper had been in the printers' hands for some time when Professor Sars' supplement appeared with the description of *Ætidiopsis*. Consequently I do not know to which name priority should be given, nor do I feel yet certain that the genus described briefly by Sars is identical with the *Faroella* described by me in the *J. M. B. Ass.* of 1904. Certainly the *Faroella* of the Antarctic Sea has some differences, and I therefore retain the name for the genus which I originally gave, more especially as Professor Sars, who has examined some Irish specimens, states, as I am informed, that they are not identical with his.

FAROELLA ANTARCTICA.

(Plate II., figs. 1, 2, 3, 4.)

♂ size 4.3 mm. (cephalothorax 3.3 mm., abdomen 1.0 mm.). The fore-body is therefore over three times as long as the abdomen. The head and first thoracic segment are united, the two last segments of the thorax separate, the anterior segment over twice as long as the four last segments; the most posterior of these is well defined from the one in front, small, and laterally prolonged into stout spines which are about three-quarters as long as the genital segment. In dorsal aspect the head is rather triangular-shaped, and on each side below the level of the posterior antennæ, laterally expanded. In the lateral aspect the head is evenly rounded, oval, and with stout two-pointed

rostrum directed forwards, with slight curve downwards, the rostral spines not at all divergent, as in Sars' picture of *Ætidiopsis*. The whole cephalothorax is studded with fine and closely-set prickles. Abdomen of four segments, slender, the genital only a little larger than the next, with strong ventral protuberance, $> Ab\ 2 > Ab\ 3 > Ab\ 4$. Furcal segments as long as the anal, and twice as long as broad. Tail bristles four on each side, with very short and delicate ventrally placed accessory bristles. Anterior antennæ reaching just beyond the end of the genital segment, the first two joints comparatively large and as long as the next five joints, the combined eighth and ninth joint as long as the two joints either proximal or distal to it, the eighteenth and nineteenth joints longer than those proximal or distal, and the twenty-fourth separate from the twenty-fifth. All joints only sparingly setiferous.

Posterior antennæ with exopodite a little longer only than the endopodite.

Anterior foot-jaws with the outer margin of the basal only a little convex, the fifth lobe longer than the four proximal and nearly equally-sized lobes, the *Ri* small but distinctly segmented. Each lobe with three bristles, two each on the first, second, third, and one on the fourth, being stout, long, and with wide apart stiff marginal bristles. Bristles of *Ri* long, not feathered, but slightly serrated marginally.

Posterior foot jaws having proportionately $B\ 1 : B\ 2 : Ri = 10 : 12 : 5$. *B\ 2* therefore a little longer than *B\ 1*, and over twice as long as *Ri*; *B\ 1* two and a half times as long as broad, with two small lobes with respectively two and three short bristles; *B\ 2* four times as long as broad, its marginal bristles very small and distal of the middle. *Ri* short and distinctly five-segmented.

Maxillæ, *Le\ 1* with nine bristles and its outer margin nearly straight; *B\ 2* with five, and not segmented from *Ri* with thirteen bristles; *Le\ 2* a small lobe, but without bristles; *Re* small, longer than broad, and with ten bristles; *Li\ 1* with nine large hooks and four bristles; *Li\ 2* and *3* well-formed lobes.

First feet. *Ri* one-jointed; *Re* three-jointed, with three long thin marginal spines.

Second feet. *Ri* two-jointed, *Ri\ 1* short, *Ri\ 2* very elongated, and nearly four times as long as *Ri\ 1*. The whole *Ri* only extends to the distal end of *Re\ 2*. On the distal part of the surface of *Ri\ 2* is a bunch of fine hairs; *Re\ 3* is as long as *Re\ 1 + 2*, and its end saw is longer than the *Re\ 3* and beset with a great number (exceeding fifty) of closely-set teeth, of which those in the middle are the largest.

Fourth feet. *Ri* and *Re* of three segments each. *Ri* proportionately longer than in the other feet, and the third segment as long as *Ri\ 1 + 2*, and a little over three times as long as broad, with fine hairs on the surface distally. *Re\ 3* much longer than *Re\ 1 + 2* and over three times as long as broad. Its end saw three-quarters as long as the *Re\ 3*, and with over fifty closely-set teeth. No fifth feet.

The chief points in which this Antarctic species differs from that of the northern seas are in its greater size, the greater strength of the rostrum, the rather different body proportions, and the more equal size of the rami of the posterior antennæ. The

chitin everywhere in the cephalothorax is almost covered with prickles, and the whole animal is more robust.

MICROCALANUS (SARS).

MICROCALANUS PUSILLUS.

(Plate II., fig. 5.)

Microcalanus pusillus, G. O. Sars, Crustac. of Norway, IV. (1903), p. 156.

Pseudocalanus pygmæus, Sars, Nörwegn. N. Polar Expdn., Vol. V. Crustacea, 1900.

„ „ Giesbrecht, ' Belgica ' Report, p. 20.

Sars originally described a small Calanoid, *Pseudocalanus pygmæus*, from Nansen's Polar Expedition, which he subsequently re-named *Microcalanus*, and included in the new genus a second and still smaller form of *M. pusillus*. Giesbrecht described a small Calanoid from the Antarctic seas, which agreed generally with Sars' Polar species, except for very small differences, *e.g.* the length of the anterior antennæ, and the length of the outer marginal spines of the exopodites of the feet. The size varied, mostly from 0.7–0.75 mm.; some were even smaller. *P. pygmæus*, Sars (= *M. pygmæus*, Sars), is a little longer, *viz.* .86 mm. (Sars).

The 'Discovery' collection contains many examples of a very small Calanoid which agrees so closely with Sars' *M. pusillus*, that I regard them as identical; and Giesbrecht's *Pseudocalanus pygmæus* must, I think, be also regarded as identical. This small Calanoid is one of the few examples of complete agreement in form and structure between the Polar and Antarctic forms, and on that ground is of interest.

The female is 0.60 mm. long. Cephalothorax two and a half times longer than the abdomen; the head and first segment united, the former evenly rounded and with short, delicate rostrum; the greatest breadth not quite half the length; the last thoracic segment with rounded and only slightly produced margins; abdomen of four segments. The genital segment is nearly twice as long as the next, which is rather larger than the distal segment, and the anal as long as the segment preceding it. Furcal segments as long as the anal and longer than broad, with four short terminal bristles. The genital segment is very swollen laterally, but symmetrical, and rather tumid ventrally.

Anterior antennæ reaching about the end of the genital segment, and of twenty-three joints.

Posterior antennæ with *Re* about one-third longer than the *Ri*.

Mandibles with *Ri* much longer than *Re*, both rami fully segmented. Masticatory plate with strong cutting teeth seven or eight in number, and distally nearly half as broad as long.

Anterior foot jaws with five well-formed lobes, of *Calanus* type, with well-segmented *Ri*.

Posterior foot jaws with segments proportionately $B\ 1, B\ 2, Ri = 9, 8, 9$. Ri elongated and thin, with five distinct segments.

First feet, Ri of one, Re of three segments, the first without Se ; Ri with four Si .

Second feet, Ri of two, Re of three segments; no Si on $B\ 1$ or $B\ 2$.

Fourth feet, Ri and Re of three segments each. The end saw extremely long, and longer than the whole Re , broad and coarsely serrated marginally.

In the second to the fourth feet the $Re\ 3$ has three outer marginal spines. No fifth feet.

The few males present were apparently immature.

HALOPTILUS (GIESBRECHT).

One species of this genus appears to be characteristic of the Antarctic fauna, since it is present in very many of the 'Gauss' samples, but curiously enough, occurred only once in the 'Discovery' collection. It is large, and distinguished at a glance from any other examples of the genus by the prominent black ocellus dorsally placed, an organ not possessed by any other species of *Haloptilus*.

HALOPTILUS OCELLATUS.

(Plate III., figs. 1, 2.)

Haloptilus ocellatus, Wolfenden, Plankton Studies, Part I. (1905), p. 14.

♀, of length, from the end of the frontal spine to the end of the furca, 8.75 mm., with cephalothorax over five times as long as the abdomen; the conjoined head and first segment much longer than the remaining segments of the anterior body (about one-third); the last two segments of the cephalothorax united, and with rounded margins. On the second segment, in the centre of the dorsum, or a little to the right of the centre, is a prominent and very black rounded pigmented ocellus, standing out in clear contrast to the rest of the very transparent animal. The frontal spine is long, tapering, and usually a little curved downward, and often laterally, towards the tip. The distance from the tip of the spine to the base of the anterior antennæ is equal to the distance between the latter and nearly to the distal end of the second cephalic segment. Abdomen of four segments, with the anal as long as the two preceding, and the furcal segments over twice as long as broad.

Anterior antennæ a little longer than the whole animal, reaching beyond the furca by about three or four joints, and sparingly setiferous.

Posterior antennæ with endopodite very long and exopodite very short, the latter of six joints, with doubtful division of the last, which would be the seventh joint, the basal or first segment very long, and nearly as long as the joints distal to it. Re not

more than one quarter as long as *Ri* 1. *Re* 1 elongated and seven or eight times as long as broad.

Anterior foot jaws with a rather stout, but unarmed hook on the fifth lobe, not longer, however, than the other bristles.

Posterior foot jaws thick, with *Ri* of similar thickness to *B* 2, and of five segments; the five stout curved hook bristles of nearly equal length, the two terminal only a little the longest and thickest.

Mandibles with *Ri* very long and *Re* only as long as *Ri* 1; masticatory plate with outer stout, broad-based, conical and curved tooth; three pointed short teeth internal to it, rather like *H. mucronatus*.

Maxillæ.—First inner lobe with six bristles, of which only two of the distal ones are stout hooks; second inner lobe with one stout long bristle; third inner lobe with one stout elongated and two short thin bristles; *B* 2 about as broad as long, with four elongated and thick bristles and one thin, short proximal bristle, *Ri* longer than broad, and about three-quarters as long as *B* 2 and only half its width, and with five bristles; *Re* very long, twice as long as *Ri* + *B* 2, and nearly twice as long as broad, with eleven bristles, of which the three innermost are short and thin.

All feet with three jointed rami, *Re* of fifth pair only five-sevenths as long as *Re* of fourth pair; *Ri* of fifth pair only as long as *Re* 1 + 2; *Re* 3 longer than *Re* 1 + 2, twice as long as broad, with three inner bristles, two outer spines, and end spine nearly as long as the last segment. I have not yet seen the ♂ of this species.

OITHONA (BAIRD).

Two species of this genus occur in these collections, one of which, *viz.*, *Oithona similis*, is of world-wide distribution, and occurs with great frequency in Antarctic collections; the other, to which the name *Oithona frigida* has been given by Giesbrecht (and which has been fully described by him in the 'Belgica' report, *vide ante*), occurs very sparingly in the 'Discovery' collection.

HARPACTICUS (DANA).

HARPACTICUS FURCIFER.

Harpacticus furcifer, Giesbrecht, 'Belgica' Report, p. 37.

The ♀ of this species was first described by Giesbrecht in the 'Belgica' report; and in the 'Discovery' collection, marked 4. i. 02. W.Q., occurred three specimens of the male, though female examples were conspicuously absent.

The ♀, according to Giesbrecht, is 1.55 mm. long; the rostrum small, the series of points on the abdominal segments not numerous, the furca as long as both last abdominal segments, narrowing distally and about three times as long as broad; the

anterior antennæ nine-jointed, the exopodite of the posterior antennæ like *H. chelifer*, but smaller, the second basal of the mandible like *H. brevicornis* (= *H. fulvus*), and the exopodite scarcely half as long as the endopodite; both rami of the maxillæ are about equal; the first lobe of the anterior foot jaws has three bristles, the fourth lobe is long, and its hook short, the posterior foot jaw is much thinner and weaker than in *H. chelifer* and *H. brevicornis* and more like *H. flexus*. The first feet have thin and weak terminal claws, both rami of only two segments, and the endopodite is short, the joints of both branches being broader than in *flexus*; the endopodites of the second and fourth feet are larger in proportion to the exopodites than in *chelifer* and *brevicornis*, and in the fourth pair reach to the middle of the last joint of the exopodite; the bristles on the second endopodite joint are, however, two, instead of one as in *chelifer*; the last joint of the fifth feet is comparatively small, and is scarcely half so broad as this; its last joint has five, the process of the basal joint, four bristles.

The striking feature of *H. furcifer* is the length of the furcal segments, which are usually very short in this genus, and though related to *H. flexus*, it differs in the size, which, in the latter species, is only .64 mm. in length, compared with 1.5 in *H. furcifer*.

EXPLANATION OF THE PLATES.

PLATE I.

- Calanus propinquus*, fig. 1. Whole animal, ♀. Oc. 3, obj. 2 in.
 „ „ fig. 2. Whole animal, ♂. Oc. 3, obj. 2 in.
 „ „ fig. 3 and 3a, ♂. 5th pair of feet. Oc. 3, obj. $\frac{1}{2}$ in.
 „ „ fig. 4. ♀. Basal joint of 5th foot. Oc. 3, obj. $\frac{1}{2}$ in.
 „ *simillimus*, fig. 5. Whole animal, ♀. Oc. 3, obj. 2 in.
 „ „ fig. 6. Basal joint of 5th foot. Oc. 3, obj. $\frac{1}{4}$ in.
 „ *tonsus*, fig. 7. Whole animal. ♀. Oc. 3, obj. 1 in.
 „ „ fig. 8. Basal joints of 5th foot, ♀. Oc. 3, obj. $\frac{1}{4}$ in.
 „ *acutus*, fig. 9. Whole animal, ♀. Oc. 3, obj. 2 in.
 „ „ fig. 10. Basal joints of 5th foot, ♀. Oc. 3, obj. $\frac{1}{2}$ in.

PLATE II.

- Euroella antarctica*, fig. 1. ♀, whole animal. Oc. 3, obj. 2 in.
 „ „ fig. 2. ♀, Posterior foot-jaw. Oc. 3, obj. 1 in.
 „ „ fig. 3. ♀, 1st foot. Oc. 3, obj. 1 in.
 „ „ fig. 4. ♀, 2nd foot. Oc. 3, obj. 1 in.
Microcalanus pusillus, fig. 5. ♀, whole animal. Oc. 3, obj. $\frac{1}{2}$ in.
Rhincalanus grandis, fig. 6. ♀, whole animal. Oc. 3, obj. 2 in.

PLATE III.

- Haloptilus ocellatus*, fig. 1. ♀, whole animal. Oc. 3, obj. 2 in.
 „ „ fig. 2. 5th foot, ♀. Oc. 3, obj. 1 in.
Metridia princeps, fig. 3. Whole animal, ♀. Oc. 3, obj. 2 in.
 „ „ fig. 4. 5th pair of feet, ♀. Oc. 3, obj. $\frac{1}{2}$ in.
 „ „ fig. 5. 2nd pair of feet, ♀. Oc. 3, obj. 1 in.
Gaetanus antarcticus, fig. 6. ♀, whole animal. Oc. 3, obj. 2 in.

PLATE IV.

- Euchæta similis*, fig. 1. ♀, whole animal. Oc. 3, obj. 2 in.
 „ „ fig. 2. ♀, 1st foot. Oc. 3, obj. 1 in.
 „ „ fig. 3. ♀, 2nd foot. Oc. 3, obj. 1 in.
 „ „ fig. 4. ♀, abdomen and genital segment. Oc. 3, obj. 2 in.
 „ *antarctica*, fig. 5. ♀, abdomen and genital segment. Oc. 3, obj. 2 in.
 „ „ fig. 6. ♀, abdomen, lateral view. Oc. 3, obj. 2 in.

PLATE V.

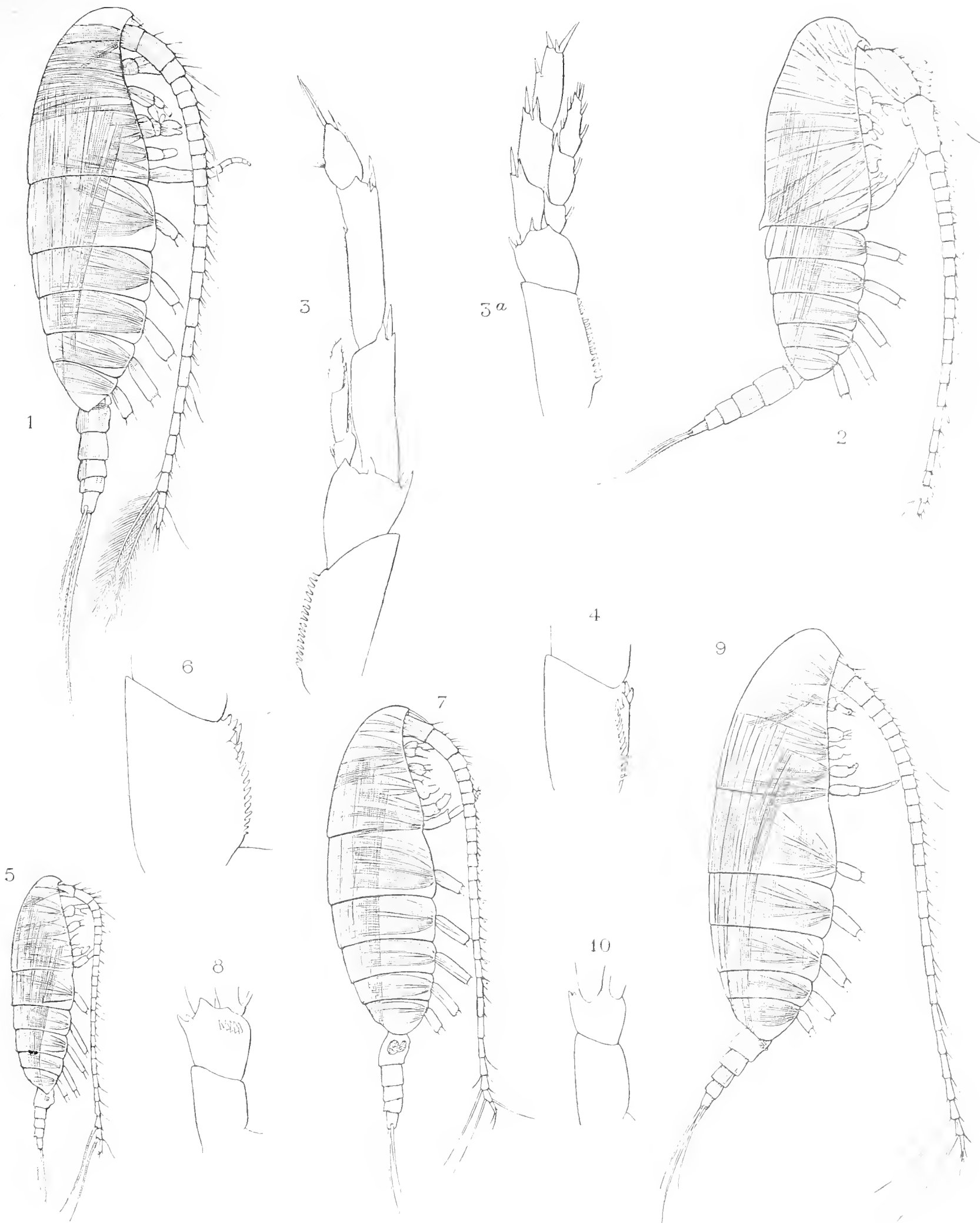
<i>Stephus longipes</i> ,	fig. 1.	Whole animal, ♂.	Oc. 3, obj. $\frac{1}{2}$ in.
" "	fig. 2.	Whole animal, ♀.	Oc. 3, obj. $\frac{1}{2}$ in.
" "	fig. 3.	Whole animal, ♀.	Oc. 3, obj. $\frac{1}{2}$ in.
" <i>antarcticum</i> ,	fig. 4.	Whole animal, ♀.	Oc. 3, obj. 1 in.
" "	fig. 5.	Whole animal, ♀, dorsal.	Oc. 3, obj. 1 in.
" "	fig. 6.	5th feet, ♀.	Oc. 3, obj. $\frac{1}{2}$ in.
" "	figs. 7, 8.	5th feet, ♂.	Oc. 3, obj. $\frac{1}{2}$ in.

PLATE VI.

<i>Paralabidocera hodgei</i> ,	fig. 1.	♀, last thoracic segment and abdomen.	Oc. 3, obj. $\frac{1}{2}$ in.
" "	fig. 2.	Whole animal, ♀.	Oc. 3, obj. $\frac{1}{2}$ in.
" "	fig. 3.	5th foot, ♀.	Oc. 3, obj. $\frac{1}{2}$ in.
" "	fig. 4.	4th foot, ♀, exopodite.	Oc. 3, obj. $\frac{1}{2}$ in.
" "	fig. 5.	1st foot, ♀.	Oc. 3, obj. $\frac{1}{2}$ in.
" "	fig. 6.	2nd foot, ♀.	Oc. 3, obj. $\frac{1}{2}$ in.
" "	fig. 7.	Posterior antennæ, ♀.	Oc. 3, obj. $\frac{1}{4}$ in.
" "	fig. 8.	Maxilla, ♀.	Oc. 3, obj. $\frac{1}{4}$ in.
" "	fig. 9.	Mandible, ♀.	Oc. 3, obj. $\frac{1}{4}$ in.
" "	fig. 10.	Anterior foot-jaw, ♀.	Oc. 3, obj. $\frac{1}{4}$ in.
" "	fig. 11.	Terminal lobes of post-footjaw, ♀.	Oc. 3, obj. $\frac{1}{4}$ in.
" "	fig. 12.	Whole animal, ♂.	Oc. 3, obj. $\frac{1}{2}$ in.
" "	fig. 13.	5th feet, ♀.	Oc. 3, obj. $\frac{1}{2}$ in.

PLATE VII.

<i>Xanthocalanus magnus</i> ,	fig. 1.	Whole animal.	Oc. 3, obj. 2 in.
" "	fig. 2.	Rostrum.	Oc. 3, obj. 1 in.
" "	fig. 3.	Posterior foot-jaw.	Oc. 3, obj. 1 in.
" "	fig. 4.	Anterior foot-jaw.	Oc. 3, obj. $\frac{1}{2}$ in.
" "	fig. 5.	Posterior antenna.	Oc. 3, obj. 1 in.
" "	fig. 6.	Maxilla.	Oc. 3, obj. $\frac{1}{2}$ in.
" "	fig. 7.	1st foot.	Oc. 3, obj. 1 in.
" "	fig. 8.	2nd foot.	Oc. 3, obj. 1 in.
" "	fig. 9.	5th foot.	Oc. 3, obj. $\frac{1}{2}$ in.
" <i>antarcticus</i> ,	fig. 10.	5th foot.	Oc. 3, obj. $\frac{1}{4}$ in.
" "	fig. 11.	Posterior foot-jaw.	Oc. 3, obj. $\frac{1}{2}$ in.



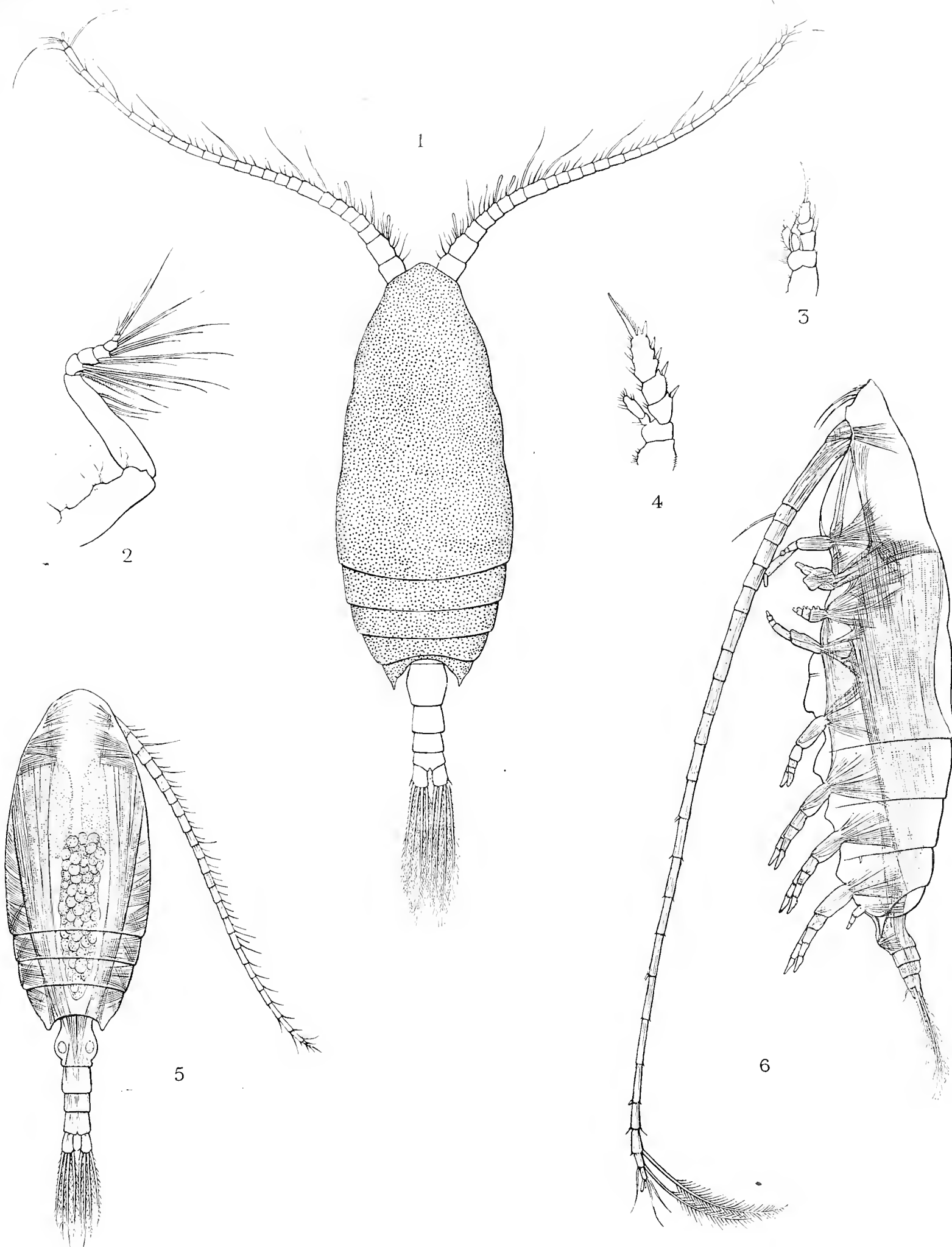
Antarctic (Discovery) Exp.

Marion Lees del. Butterworth sc

Copepoda pl. I.

Calanus propinquus (1-4).
 „ similimus (5, 6).
 „ tonsus (7, 8).
 „ acutus (9, 10)





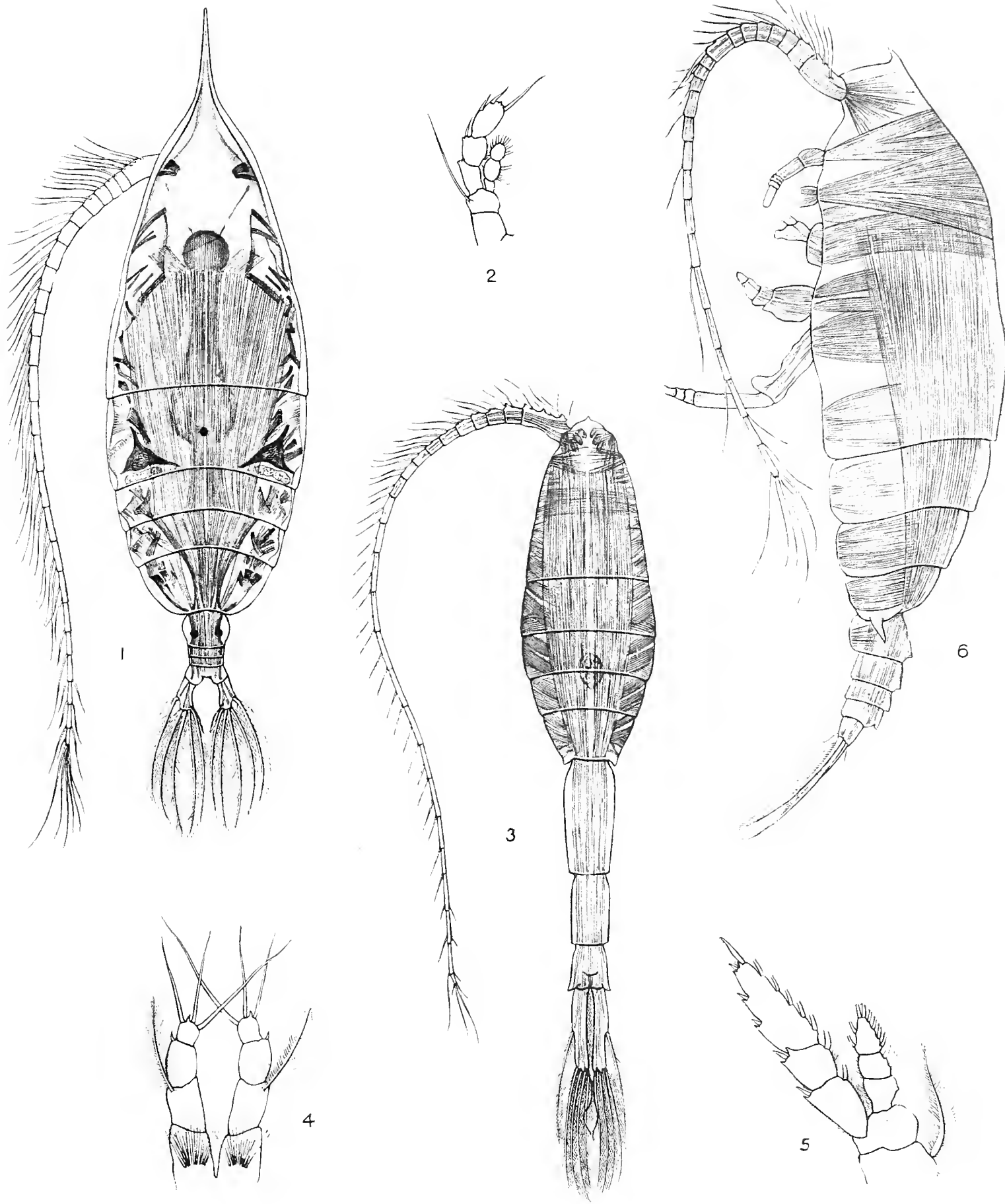
Antarctic (Discovery) Exp.

Marion Lees, del. Butterworth, sc.

Copepoda pl. II.

Faroella antarctica (1-4). *Microcalanus pusillus* (5).
Rhinocalanus grandis (6).





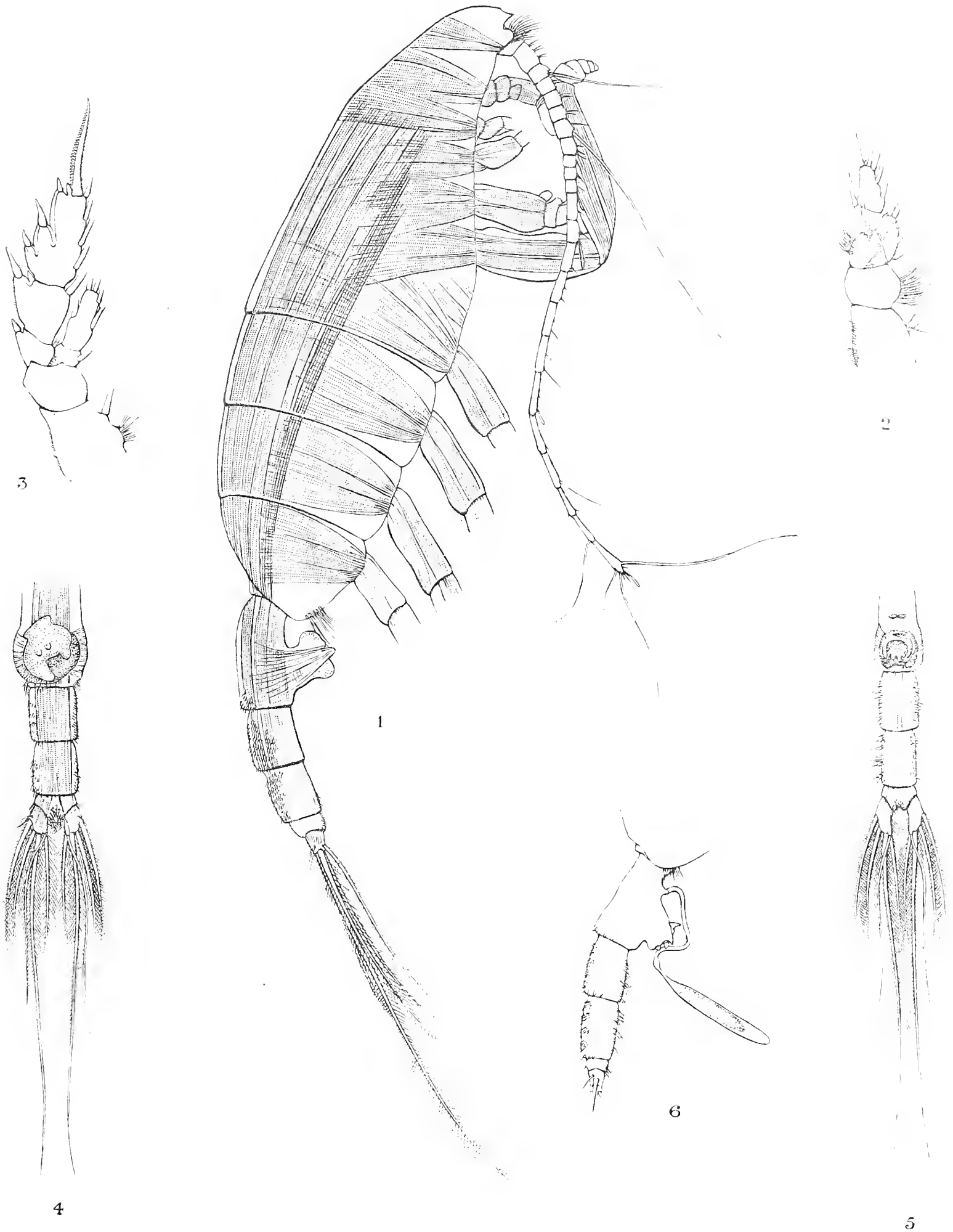
Antarctic (Discovery) Exp.

Marion Lees, del. Butterworth, sc.

Copepoda pl. III.

Haloptilus ocellatus (1, 2).
Metridia princeps (3—5).
Gaetanus antarcticus (6).



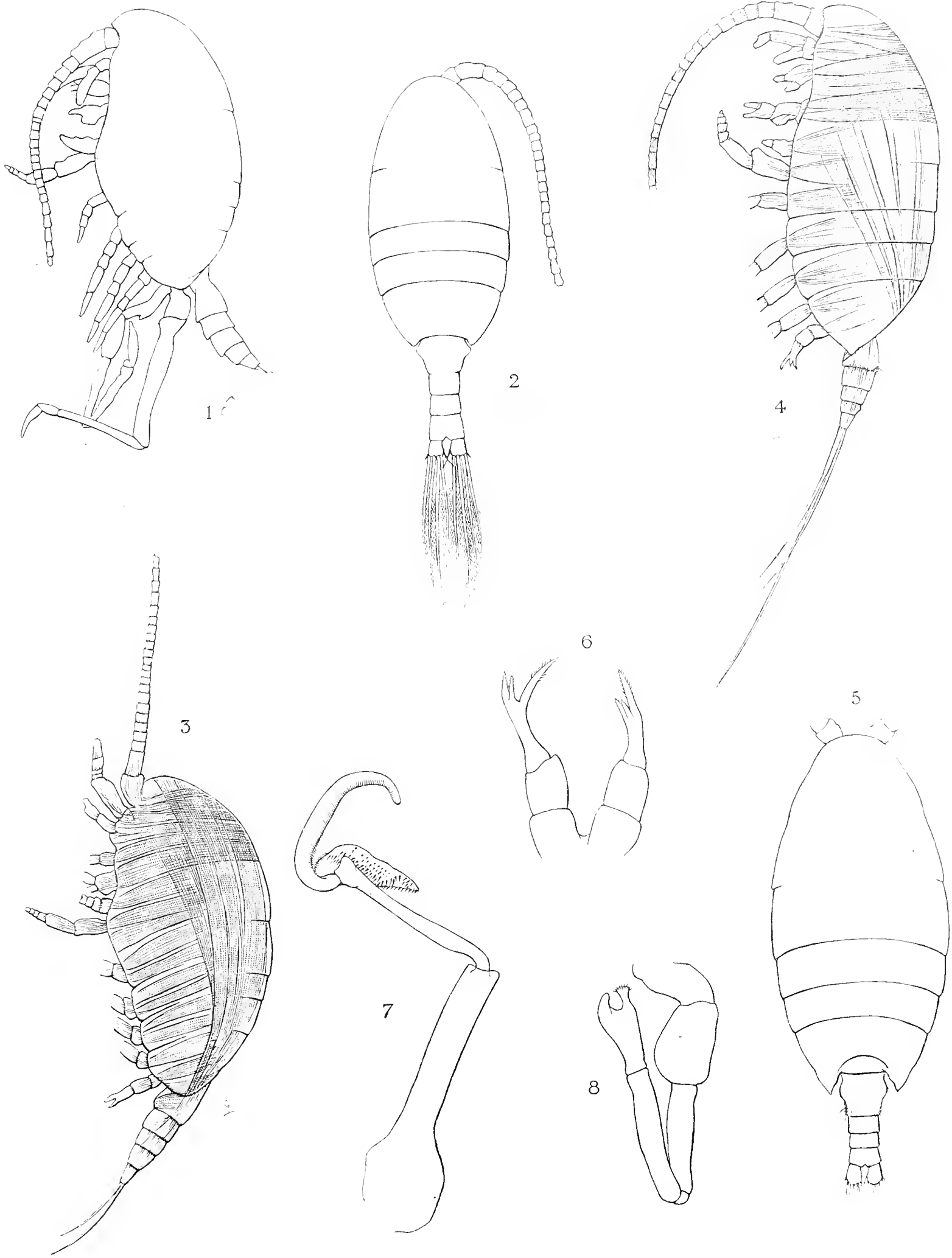


Antarctic (Discovery) Exp.

Marion Lees, del. Butterworth sc.

Copepoda pl. IV.
Euchaeta similis (1—4).
 „ *antarctica* (5, 6).





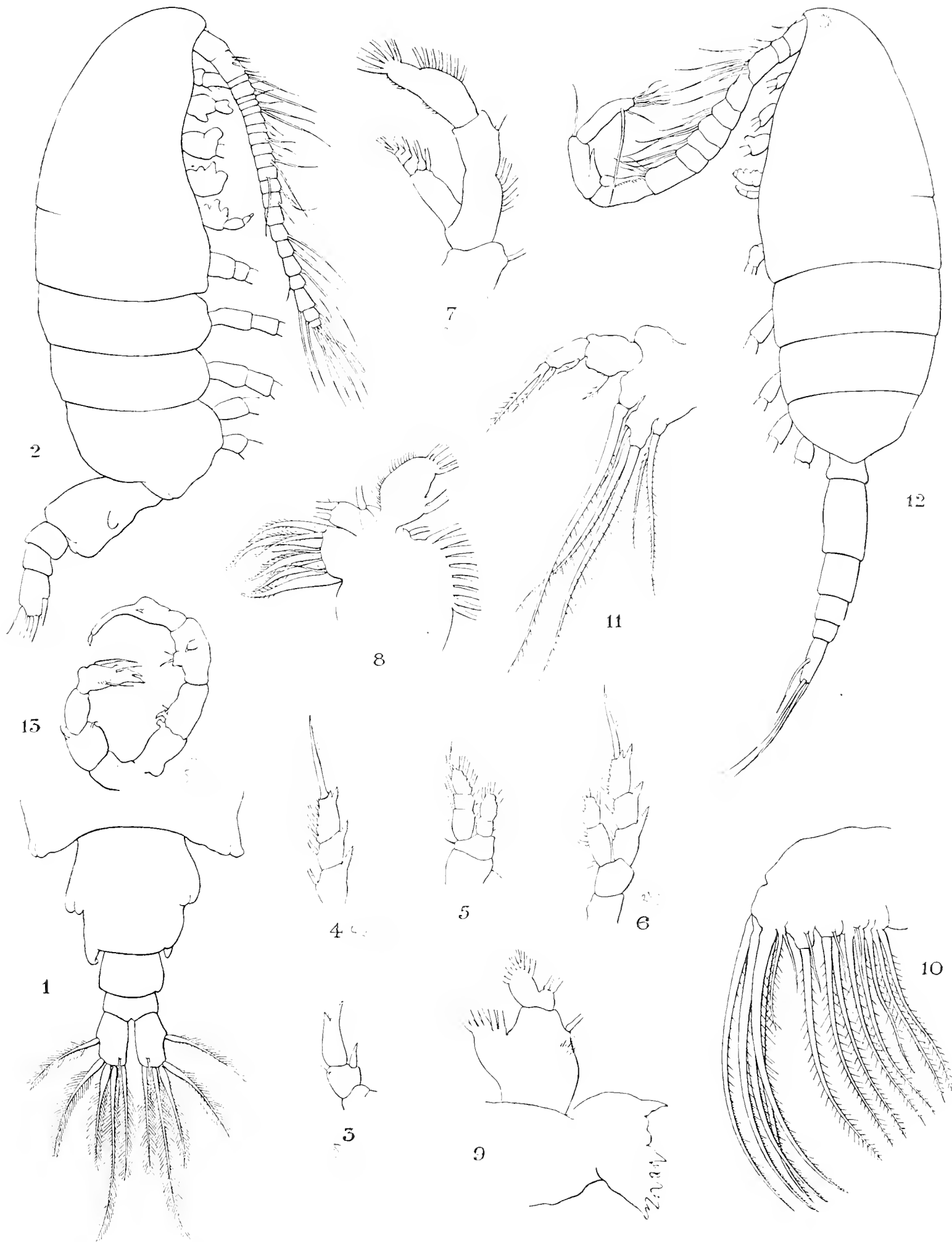
Antarctic (Discovery) Exp.

Marion Lees, del. Rutterworth sc.

Copepoda pl. V.

Stephus longipes (1—3).
 „ *antarcticum* (4—8).





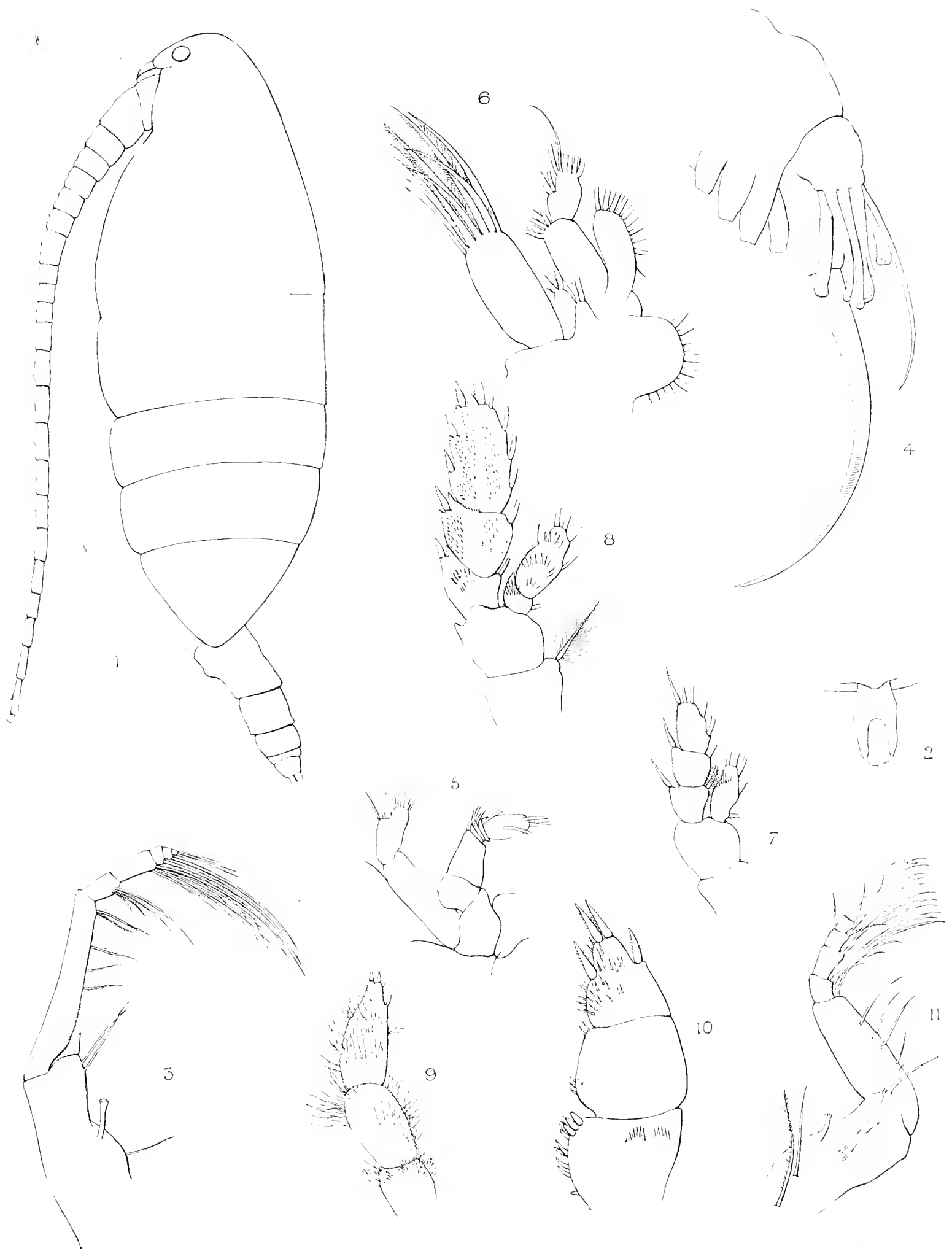
Antarctic (Discovery) Exp.

Marion Lees del. Butterworth sc.

Copepoda pl. VI.

Paralabidocera.





Antarctic (Discovery) Exp.

Marion Lees del. Butterworth sc.

Copepoda pl. VII.

Xanthocalanus magnus (1—9).
 „ *antarcticus* (10, 11).



Book - page 100

CRUSTACEA.

IX. ISOPODA. *(Vol. V, 100)*

By T. V. HODGSON, F.L.S.

(10 Plates.)

THE collection of Isopoda brought from the Antarctic by the 'Discovery,' if not a large one, possesses no small degree of interest.

No less than twenty-five species were captured, and, with a few exceptions, these are not very numerous in individuals, in fact the number of species represented by a single specimen or by only two or three is unduly large. The labour involved in collecting in an ice-covered area was the only serious difficulty to contend with; of course the ice sheet reduced very considerably the area of operations, open water and a boat would have enormously increased the collections, and though the 'Discovery' was in Winter Quarters six weeks before the sea was effectively closed, that was a busy period, and it was only at intervals that a boat's crew could be obtained.

Another cause which operated against big collections was, in my opinion, the immense numbers of the Amphipod *Orchomenopsis rossi* which swarmed into the traps, devouring the bait, and sometimes the specimens captured, and which were themselves captured ten to thirty thousand at a time.

I have, I think, satisfactorily proved that *Serolis cornutus* Studer, is merely the immature form of *S. trilobitoides* Eights. The specimens captured by the 'Discovery' are not fully grown, but they are sufficiently so to show all the essential features described by that keen observer, Eights. Dr. Studer's specimens, as well as those described by Mr. Beddard, are much smaller and obviously far from mature. I do not think there can be any further doubt on this question.

No less than seven of the species described in the 'Southern Cross' Report have been found again, one in the same locality, the others with a much extended range, passing, in some cases, to the opposite side of the southern hemisphere.

The Arcturidæ is another family in which specific characters become seriously involved in sexual variation. The male and female of one species, *Antarcturus franklini*, appear on Pl. V. as two species, the male being there indicated under the name *A. australis*. It was only when all the specimens of both sexes, or as it was then thought to be, both species, came to be overhauled that the error was noticed. I am not aware of any such distinct case of sexual variation in other members of the genus, but that it occurs to a less extent is perfectly well known. The only species other than *Serolis trilobitoides* Eights, which was taken close to the Antarctic Circle, just as we were leaving those regions, that can be considered large is *Glyptonotus acutus*

Richardson. We were certainly unfortunate in not capturing a greater number of specimens. The small species belonging to the Janiridæ, Munnidæ and their allies were very abundant and much time was spent in going over the sponge débris, which was invariably the predominant feature in the shallow water fauna; they were taken for the most part by the D-net inside the 25-fathom line, and it is among these forms that the chief interest in the collection lies. Seven species, mostly assigned to new genera, have their eyes on enormous peduncles. This, I believe, to be an entirely new feature. In dealing with the Isopoda of the French Antarctic Expedition (12) Miss Richardson has introduced two species possessing this interesting feature to science; the 'Discovery' adds five more, and among those specimens the ocular peduncle is even more slender and elongated. Under these circumstances can the Isopoda be regarded as universally sessile-eyed? Up to the present it has been so, and the Munnidæ have been considered to be on the way to a different state of things. Among that family it is a very moot point whether the eye can be said to be on a peduncle at all, as the cephalic process is so large, but now these new southern forms show a long and slender peduncle quite on a par with those of the podophthalmous crustacea, which reduces the value of a hitherto characteristic feature of this group to a minimum, and the existence of a joint has only to be proved to destroy it altogether.

I here append a list, as far as I have been able to ascertain, of all Isopoda hitherto obtained in the Antarctic regions; several of these are as yet little more than mere names to me. Those taken by the 'Discovery' are marked with *. The total number is one hundred and eleven, of which twenty-nine belong exclusively to the Antarctic, seven more belong to both the Arctic and sub-Antarctic regions, and the remaining seventy-five exclusively to the latter. As stated in my Report on the 'Discovery' Pycnogonida, I take the northern limit of the sub-Antarctic region to be the mean annual isotherm of the surface water of 45° F., as defined by Buchan in the concluding volume of the 'Challenger' Reports, and the latitude 60° S. as the boundary between the sub-Antarctic and the Antarctic regions proper. I have, however, gone a step further in dealing with some Pycnogonids from the Magellan Straits. I then found it desirable to define a Magellan region, and therefore divided the entire Antarctic into three provinces, naming them from their points of attack, it being obvious that any visit to the South Polar regions would be made from the land masses to which these names refer, Kerguelen, of course, standing for Africa.

In accordance with the above I have noted the province from which each species has been taken :—

Australasian province between long. 100° E. and long. 130° W.

Kerguelen province between long. 100° E. and long. 20° W.

Magellan province between long. 20° W. and long. 130° W.

It may reasonably be objected that these boundaries are purely artificial, and that

it would have been more appropriate to make the provinces coincide with the oceans to the north. It may be so, but it seems to me to name the provinces from the point of attack is the wisest course in the present state of our knowledge. The more I see of the South Polar fauna the more certain I become that a very large proportion of species have a circumpolar distribution. It would also appear that the northwardly projecting spur of Graham's Land, which passes for some considerable distance beyond the Antarctic circle, constitutes a barrier round which species have a difficulty in passing. Whether the South Polar fauna originated in those latitudes and has spread northwards, or whether it has acquired its present aspect by migration from the north, is a speculation which will be material for discussion for many years to come. Be this as it may, our greatest knowledge will lie nearest to the three points of attack, and from these it will be comparatively simple to investigate the passage of various species northwards into the great oceans. A circumpolar fauna will specialise more or less distinctly as it passes northwards, and its ancestors or other relations become separated by the great land masses. Or, if investigation shows the migration to be in a southerly direction, we have in those oceans three independent streets down which the fauna passes to mix beyond their junctions, or to pass on to the uttermost limit where uniform conditions, within certain limits, must have their effect.

The collection brought back by the 'Français' from the west coast of Graham's Land is very like that of the 'Discovery,' no less than eight species are common to both, their total number being thirteen.

The collection of the 'Scotia' is still in my hands for description, the shallow water and littoral forms come from a more northerly latitude, the South Orkneys, the deep sea forms from the Weddell Sea. I can only say here that this collection does not contain a single species taken by the 'Discovery.' Three other Antarctic collections remain to be described; how far they will bear out the opinion expressed above remains to be seen.

							Antarctic.	Sub-Antarctic.
	<i>Apseudes antarctica</i>	Beddard	.	.	.	.	.	×
	„	<i>spectabilis</i>	Studer	.	.	.	.	×
	<i>Tanais willemoesi</i>	Studer	.	.	.	.	.	×
	„	<i>hirsutus</i>	Beddard	.	.	.	.	×
	<i>Typhlotanais kerguelensis</i>	Beddard	.	.	.	.	.	×
	<i>Leptognathia australis</i>	Beddard	.	.	.	.	.	×
✱	<i>Nototanais dimorphus</i>	Beddard	.	.	.	.	.	×
*	„	<i>antarcticus</i>	Hodgson	.	.	.	.	×
	<i>Paranthura neglecta</i>	Beddard	.	.	.	.	.	×
*	<i>Leptanthura glacialis</i>	.	.	.	.	.	.	×
*	<i>Gnathia antarctica</i>	Studer	.	.	.	.	.	×
	„	<i>tuberculosa</i>	Beddard	.	.	.	.	×
*	<i>Euneognathia gigas</i>	Beddard	.	.	.	.	.	×
	<i>Æga magnifica</i>	Dana	.	.	.	.	.	×
	„	<i>semicarinata</i>	Miers	.	.	.	.	×
	„	<i>punctulata</i>	Miers	.	.	.	.	×
	„	<i>edwardsi</i>	Dollfus	.	.	.	.	×

									Antarctic.	Sub-Antarctic.
<i>Idotea metallica</i> Bosc.		×
„ <i>miersii</i> Studer		×
<i>Edotia tuberculata</i> Guer-Men.		×
„ <i>magellanica</i> Cunningham		×
„ <i>lilljeborgi</i> Ohlin		×
<i>Cleantis granulosa</i> Heller		×
<i>Notasellus sarsi</i> Pfeffer		×
* „ <i>australis</i> Hodgson	×	
<i>Jæropsis marionis</i> Beddard		×
* <i>Austronanus glacialis</i>	×	
* <i>Austrofilus furcatus</i>	×	
<i>Jæra antarctica</i> Pfeffer		×
<i>Jais pubescens</i> Dana		×
„ <i>hargeri</i> Bovallius		×
<i>Ectias turqueti</i> Richardson	×	
<i>Iolanthe acanthonotus</i> Beddard	×	
* <i>Coulmannia australis</i>	×	
* „ <i>frigida</i>	×	
* <i>Notoxenus spinifer</i>	×	
<i>Munna maculata</i> Beddard		×
„ <i>pallida</i> Beddard		×
* <i>Haliacris antarctica</i> Pfeffer		×
<i>Austromunna antarctica</i> Richardson	×	
* „ <i>rostrata</i>	×	
* <i>Antias charcoti</i> Richardson	×	
<i>Pleurogonium albidum</i> Beddard		×
„ <i>serratum</i> Beddard		×
* <i>Austrosignum grande</i>	×	
* „ <i>glaciale</i>	×	
<i>Neasellus kerguelensis</i> Beddard		×
<i>Astrurus crucicauda</i> Beddard		×
<i>Munnopsis australis</i> Beddard		×
<i>Eurycope sarsi</i> Beddard		×
„ <i>fragilis</i> Beddard	×	×
„ <i>spinosa</i> Beddard		×
<i>Echinozoe spinoza</i> Hodgson	×	
<i>Ilyarachna quadrispinosa</i> Beddard		×
* <i>Notopais spicatus</i>	×	
<i>Acanthocope spinicauda</i> Beddard		×
<i>Tylos spinulosus</i> Dana		×
<i>Porcellio fuegiensis</i> Dana		×
<i>Oniscus augustus</i> Dana		×
<i>Styloniscus magellanicus</i> Dana		×

NOTOTANAIS.

Nototanaïs Richardson (12), pp. 1 & 2.

This genus has been defined by Miss Richardson as follows :—

First pair of antennæ composed of three joints in the female, and five joints in the male.

Second pair of antennæ composed of five joints in both sexes.

Cephalon of the male large at the base, and prolonged anteriorly to a narrow extremity.

Cephalon united to the first thoracic segment, leaving six segments well developed.

Uropoda biramous, each branch composed of two joints.

The first gnathopods are dissimilar in the two sexes. In the male they are much enlarged, and the propodite is furnished with a process directed backwards, a thumb, which forms a chelate hand.

This genus has been instituted for the reception of *Paratanais dimorphus* Beddard (1), and *P. antarcticus* Hodgson (7), which, on account of their strongly marked sexual dimorphism, a character they share with *Heterotananais* G. O. Sars, and other minor features, can no longer be included in any existing genus.

NOTOTANAIIS ANTARCTICUS.

Paratanais antarcticus Hodgson (8), pp. 240 & 241.

Nototananais antarcticus Richardson (12), pp. 2 & 3.

Body rather slender, but differing in its proportions in the two sexes, being rather longer in the female, notwithstanding the fact that the cephalosome is much longer in the male than in the female.

Male.—The cephalosome is pyriform, long, narrowest anteriorly; this border being obtusely angulated, and having a well-marked conical projection laterally which is occupied by the eye. This cephalosome is a little longer than the first four free segments of the mesosome.

The mesosome comprises six segments; the first is very short, and the next three progressively increase in length, the two following decrease, the last being nearly as long as the third.

The metasome is six-jointed, five of the segments being subequal in size, the last is twice as long and rounded, bearing the biramous uropoda postero-laterally.

Female.—The cephalosome is shorter and more distinctly conical than pyriform, and is not longer than the first three free thoracic segments. The proportions of these segments are similar to those of the male, though they are longer, the length of the mesosome in male and female being as 9 to 11.

First antenna. That of the male comprises five joints, of which the first is longer than the other four together, the proportion being as 6 to 4; the second is as long as the two terminal ones, the third being by a very little the shortest of the series. Except the penultimate all the joints bear a few long setæ distally; the terminal joint has half-a-dozen or thereabouts. In the female this organ is tri-articulate, the first joint being nearly twice the length of the other two together. There are a few long setæ distally and in the middle of the first joint.

The second antenna in the female has five joints: the first is short, the next two are a little longer and subequal, the fourth is very nearly as long as these three together, the terminal one is about as long as the second or third, but of course a great deal more slender. This one terminates in a group of six long setæ; setæ occur distally on all the joints except the first.

In the female the mandible is strong, the cutting edge is incurved almost to a right angle and armed with three large teeth, a broad one behind the other two. The molar tubercle is long, at right angles to the main structure; it is slightly swollen and then tapers to its posterior border. This edge bears five well-developed teeth and a discoloured tubercle within this on the posterior border. The mandible of the opposite side has a well-developed cutting edge with a prominent tubercle posteriorly, but there are no long teeth here. There is no palp.

The first maxilla has a broad base, the external margin rapidly tapering to a slender band-like structure. It is much curved inwards distally, and armed with some half-dozen strong teeth, one of which, the most external, is longer than the rest. The so-called palp rises from the inner margin of the base, and is a slender structure about two-thirds the length of the main lobe, and terminating in two long setæ.

The second maxilla is only represented by a small ovoid lobe.

The maxillipeds together have a median, heart-shaped basal joint, which is divided longitudinally; the masticatory lobe is more than half the length of the basal joint, slightly increasing in diameter to the end, which is truncate, armed with a couple of small tubercles and quite devoid of any setæ.

The palp is five-jointed. The first joint is very small, the second is the longest with an oblique distal margin, the third is triangular in shape, the apex external, and therefore this side of the joint is reduced to a minimum; the fourth joint is large, and the terminal about half the length and much more slender; this is armed with four long setæ.

The epignath is about three-quarters the length of the basal joint and irregularly ovoid.

The first appendage of the mesosome, or chelipeds, of the adult male are very largely developed. The ischium is a broad joint prolonged below the point of its articulation to a broad, curved edge, like an axe-blade. The merus is a very short joint, wedged in obliquely between the ischium and the carpus. The carpus, excepting the dactylus, is the longest joint of the limb; it is very broad and rounded posteriorly. Its inner margin is produced into a knife edge. The propodus is a stout joint about half the length of the dactylus, and carries, on its inner side, at right angles to it, a large irregularly-shaped appendage which forms a chela with the dactylus. This appendage is curved; the proximal portion is broad, flattened, and produced into a stout spur, directed inwards. The distal portion is more slender, having a swelling with a few (three) long setæ on its inner side, beyond which it terminates in a slender incurved finger. The dactylus is very long, slender, and curved, longer than any other joint in the appendage.

In the female the first appendage of the mesosome is comparatively small; the ischium is produced as a rounded lobe, much narrower than that of the male, below the point of its articulation; the merus is not very different to that of the male; the carpus is cylindrical; both these joints bear a pair of long setæ. The propodus forms a well-developed chela; the two dactyli are stout and subequal in size, with discoloured teeth at their extremities. The immovable finger has a long seta on either side of its base and another pair on the inner margin close to a series of four small teeth which end against the terminal tooth.

In the female the first leg is slender, the first joint is as long as the succeeding four, the second is very short, and the others progressively lengthen and have a few setæ distally; the setæ are strongest at the extremity of the limb; the terminal claw is very slender and more than half the length of the joint which bears it. The two following legs are similar, but the terminal claw shortens. The last three pair are a little shorter and stouter, the setæ are more spinous, and the terminal claw is comparatively short and more definitely a claw. Those of the male are similar, but longer and more slender. The oostegites number four pairs, and are attached from the second to the fifth appendages of the mesosome. Each oostegite consists of a rather broad strap-like axis, from each side of which extends a very delicate membrane, the whole forming a concave structure nearly round in shape.

The pleopods are five pairs of the appendages adapted for respiration, and are similar in both sexes. Each consists of a protopodite of two joints, the first of which is very small, a large endopodite, ovoid in shape, the inner margin of which is fringed with stiff setæ, and these increase in size to the distal extremity. The exopodite is much smaller, slightly curved, and its inner margin is similarly setose, but the setæ are much reduced in number; the posterior pleopoda differ slightly in shape. The exopodite is attached half way along the second joint of the protopodite.

A very large number of specimens were collected during the whole of our stay in Winter Quarters. They were constantly being picked out of the sponge débris and obtained inside the 25-fathom line. It would appear from the great number of individuals of all ages and sizes that the acquisition by the male of the enormously developed chelipeds takes place suddenly. There were no specimens which indicate a gradual development of these organs, nor were there any specimens of small size showing this distinctly masculine character. A large proportion of the apparently adult females show no trace of oostegites, and it is quite possible that some at least were not completely developed males. The suddenness of the change is also emphasized by the fact that the mouth organs of the fully developed male are defective.

LEPTANTHURA.

Leptanthura G. O. Sars (13), pp. 47-48.

This genus was instituted by Prof. G. O. Sars in 1899, being separated from *Paranthura* by a number of small characters. The mouth organs seem to be the

essential features upon which this separation is based, but under any circumstances the two genera are very closely allied. The following species is most nearly related to *Leptanthura*.

LEPTANTHURA GLACIALIS.

(Plate I., fig. 1.)

Specific characters :—

Uropoda as long as the metasome, broad ; the exopodite rather less than half the length of the endopodite and cordate in shape.

This species attains a length of 21 mm.

The cephalosome is the smallest segment of the body, and its anterior margin is incurved to be produced in the middle line into a short point between the insertion of the antennæ. There are no eyes.

The mesosome comprises seven distinct segments, these are elongated, and the first is longer than the cephalon, the two following are very little longer and subequal, the two succeeding ones are a little longer still and subequal, the last is very little shorter than the first.

The metasome is narrower and all the segments are distinct. The first and fifth are rather the longest, the intermediate ones being subequal in size, the sixth is narrower and longer, having the posterior margin rounded.

The telson is elongate, linguiform tapering to a blunt point, which is setose. The uropods are large and with the telson form a conspicuous caudal fan.

The first antenna (fig. 1a) has a peduncle of three stout joints, progressively shortening from the first, the third only having a distal fringe of long setæ. The flagellum consists of four joints, the first being broad but extremely short, so much so as to be easily overlooked ; the next joint is comparatively long, the two terminals progressively shorten but are together half the size of the preceding one ; both, more particularly the terminal one, are provided with long setæ.

The second antenna (fig. 1b) comprises a peduncle of four very short joints ; of the first the inner margin is much swollen, the next joint is attached at an angle and has a rounded base, otherwise it is very short and stout ; the two following are subequal in length, but the more distal one, though still stout, is little more than half the diameter of the proximal one ; both are fringed distally with long setæ. The flagellum comprises five joints, the first is the largest, the other four are very small, all are fringed distally with long setæ, those of the terminal joint forming a dense tuft quite concealing all details as to the character of this joint.

The mandible is triangular, pointed, and bears a diminutive palp, in which I have only been able to discern two joints.

The maxilla (fig. 1e) is a single comparatively broad joint tapering to a fine point.

The maxilliped (fig. 1d) is elongated and has its inner edge straight, the outer one being rather rounded to the extremity. The masticatory lobe, such as it is, is represented only by a minute conical joint bearing a single seta, a small palp of a

single joint and about one-third the length of the entire appendage is present. Its apex is provided with a few long setæ. The epignath is very small and ovoid.

The appendages of the mesosome show a transition between the subchelate first and the more locomotive posterior ones. The first of these appendages (fig. 1e) is stoutly built, the basis is a little longer than the ischium. The merus is a peculiar joint and is short, very much expanded dorsally to embrace the base of the propodus; it bears several long setæ ventrally and two or three at the dorsal extremity.

The carpus is a small joint, on the inner side of the appendage, apparently wedged in between the merus and the propodus. Internally it forms a thin, roughly rectangular plate, rather than a joint, which carries a few setæ and a couple of spines. The propodus is large, rather flask-shaped, with its inner margin expanded as a thin plate; this expansion has a thumb-like process at the inner extremity, and is armed near its anterior border with a row of small but highly specialised spines. The joint is attached near its middle to the carpus, the rounded base being adapted to the crescentic enlargement of the preceding joint.

The specialised spines are about a dozen in number and are set in distinct sockets, and a long seta is associated with each. The structure of the spine is difficult to make out, but appears to consist of a stout shaft with a group of stout teeth on one side. In some cases one or two teeth are to be seen on the other side of the shaft, but much nearer its base. I have not deemed it desirable to injure the appendage in order to examine these spines more minutely. The daetylus is long and curved, set at the external angle of the propodus, and it carries on its inner margin a small number of widely separated setæ.

The second appendage (fig. 1f) is similar to the first in general structure, the basis is, however, proportionately longer and more slender, the merus and other joints are also smaller, and the expansion of the propodus which bears the specialised spines is not so great and its margin is much more nearly parallel to the axis of the joint. The spines themselves are rather longer, the lower portion cylindrical and the upper two-thirds tapering to a blunt point. On the posterior side of the shaft about its middle there is a series of small teeth, graduating in size from below upwards, *i.e.*, from large to small. On the opposite side of the shaft, where the tapering begins, there are one or two minute teeth.

The third appendage closely resembles the previous one, the basis and ischium are subequal in length, the latter being more expanded, the remainder of the limb is similar but on a smaller scale, and the specialised spines are more uniformly digitiform with fewer accessory teeth. In the last appendage (fig. 1g) the ischium is very little shorter than the basis and is dilated dorsally, the merus is about half its length and attains its greatest diameter distally. The propodus is approximately cylindrical, and the few spines that it carries only show the minimum of specialisation.

The metasome in its entirety is a little shorter than the two posterior segments of the mesosome.

The telson is distinctly separated from the rest of the metasome, and is a long thin structure tapering near the extremity to a blunt point, which is provided with long setæ.

The uropoda are large, though the basal joint is small.

The exopodite consists of a roughly cordate plate attached by its apex and almost completely conceals the proximal joint of the endopodite. The distal margin of this joint is indented.

The endopodite is two-jointed; a substantial proximal joint supports an ovoid distal joint, not quite so long, and the outer margin of this joint is supplied with long setæ, and these are longer and form a tuft at the extremity.

The pleopoda are all much alike, the first pair are, however, stronger and very little larger than the others.

Only two specimens of this species were taken in Winter Quarters inside the 25-fathom line, one of them in a damaged condition.

GNATHIA ANTARCTICA.

(Plate I., fig. 2.)

Anceus antarcticus Studer (18), p. 4.

Gnathia polaris Hodgson (8), pp. 241-3.

Gnathia antarctica Richardson (12), pp. 3-4.

Specific characters :—

Male.

Cephalosome quadrangular, with a strongly developed spine in front of each eye. Usually with two spines near the anterior margin and the middle line.

Cephalosome and the anterior segments of the mesosome more or less spinous and fringed with long setæ.

This species was first described by Dr. Studer from an immature specimen taken off Patagonia. Miss H. Richardson identifies my *G. polaris* with *Anceus antarcticus* of Dr. Studer, which, when dealing with the Southern Cross collection, had escaped my attention. I have no reason to disagree with the identification.

The male.—The cephalosome is broad, roughly quadrangular, with the postero-lateral margins rounded; the anterior border forms three crescentic lobes, of which the median is most prominent, but only visible when the mandibles are divaricated; outside the more lateral lobes is a stout spur which is just external to the antennæ and in front of the eye, it has a broad base and its anterior border is irregular if not toothed. The lateral portion of the cephalon is rather swollen but depressed in the centre. It is covered more or less completely with minute spines.

The eyes are prominent and darkly pigmented. Immediately behind the cephalosome is a narrow crescentic segment, the first segment of the mesosome and one which does not reach the lateral margin of the body. The two following segments of the mesosome are short and broad, the next is attached by a distinct "waist" and

generally has a very obvious depression in the centre. The next, or fifth segment, is the longest, and there is a progressive increase in length from the first to the fifth, this one bears more or less distinct traces of a median longitudinal division. The sixth segment is a little shorter than the preceding, and posteriorly it terminates in three lobes, the median is short and the width of the abdomen, the lateral ones are large and project along the sides of that structure. The last segment of the mesosome is much reduced in size and almost fills the interval between these lobes. Laterally the second and third segments of the mesosome are covered with small spines or tubercles, a feature which is not brought out in the figure in the 'Southern Cross' Report. The cephalon and every segment of the thorax bears laterally a number of long slender setæ. A feature which is not alluded to in the original description is the crustaceous character of the exoskeleton, this is usually very prominent down to and including the fifth thoracic segment, although it is to a certain extent covered by a mass of diatomaceous matter. The posterior segments of the thorax and the abdomen are almost invariably thickly covered with a similar growth, often so much as to completely conceal all structural details.

The metasome consists of six joints of subequal size, the telson, a pointed triangular structure with a few long setæ distally being fused with the last one. The epimera are broad blades, curved to a slight extent backwards. The last abdominal segment has no epimera. The uropoda are well developed, the basal joint is short and stout, the two rami are subequal in length, but the endopodite is considerably broader than the exopodite, both are fringed distally with long setæ and have three shorter ones on their external borders.

The first antenna consists of a three-jointed peduncle and a short, four-jointed flagellum. The first two joints of the peduncle are short and subequal, the third is longer than the other two together, all bear a few setæ distally.

The second antenna comprises a peduncle of four joints and a flagellum of six or thereabouts. The first two joints of the peduncle are short, the third is about as long as the two preceding ones together, and the fourth is still longer; this one carries along the side of it a series of setæ of increasing length.

The mandible is scythe-like in general appearance, the amount of curvature of the free end being variable, the outer margin carries a sharp spur near its middle, and the inner cutting edge is slightly sinuous.

The maxilliped is a small structure, the basal plate is rather large, comparatively roughly triangular and attached by its truncated apex. The masticatory process is a small clavate process bearing two stout knobbed processes on the inner side. The palp consists of four small rounded joints which taper slightly from the first, and each carries a few long setæ on the outer margin.

The gnathopod is a large pyriform spoon-like structure forming an operculum over the residuum of the mouth organs. It is attached on one side near the base and its rounded free margin is fringed with delicately plumose setæ. Its surface is

marked with the three characteristic plates. The terminal joint is quite small, ovoid, with very fine setæ on its margin and stouter ones on its surface.

The pereopods are as usual five pairs and differ but little from each other. The first two pairs are smooth generally, although the carpus of the first has three stout tubercles ventrally, and the propodus bears a row of small spines along its ventral border, one large pectinated spine about two-thirds of its length, and a similar but larger one distally. In all other cases only the two larger spines are present, and these are not so distinctly pectinated. The three posterior pairs have the bases tuberculated dorsally, and the other joints are also tuberculated but to a less extent ventrally. In all cases the ischium is dilated distally and the merus has a well-developed lobe projecting forwards. The limb is fairly well supplied with setæ of varying length and strength. The dactylus is powerful.

Female.—The adult female has an enormously swollen body, and the cephalosome is much smaller than that of the male and certainly not half the length. Its anterior margin has a rounded lobe in the middle line, below which some of the mouth organs project as a wide but truncated rostrum. The preocular spines are smaller than in the male. Two anterior segments of the thorax are distinct, the following three are completely fused though sometimes the lines of segmentation can be observed. The last thoracic segment, which is considerably reduced in the male, is in the same condition in the female. The younger individuals are much more slender, but the fusion of three segments of the mesosome is equally complete; the two anterior ones are more distinct. The cephalosome is smaller still and its anterior margin is angular with a truncated projection in front, and below this the mouth organs project as a conical rostrum; the precise condition of this depends on age. The pereopoda are similar to those of the male, but more slender and without the tubercular processes.

The drawings illustrating *Gnathia polaris* in the 'Southern Cross' Report were made with great care, but one feature of importance has not been brought into the prominence it deserves, and that is the crustaceous character of the exoskeleton of the cephalon and some two or three segments of the mesosome. This, however, is a very variable feature, and during an examination of the large number of specimens brought back by that Expedition it also appears that the cephalic and thoracic outlines of the animal are not always as depicted in the illustration. The type figured requires no modification, but in other specimens where the jaws are closed the median projection is not visible; a rounded swelling appears at the base of each mandible, but I have been unable to detect the two stout spines which are so characteristic of the 'Discovery' specimens.

The preocular spines almost invariably bear a few more or less distinct subsidiary spinules on the front margin. The crustaceous character of the cephalosome and the first three segments of the mesosome is constant, though often much concealed by a diatomaceous deposit which sometimes covers the entire animal. The cephalosome, too, is more or less completely covered with very small spines; these also occur laterally

on the first three segments of the mesosome, and in some cases also extend as a band right across each segment. The last two segments of the mesosome in the 'Southern Cross' specimens are as a rule evenly rounded laterally, but in the more anterior one of the two there is sometimes a small incision which cuts off the hinder third. We must therefore expect to find a considerable amount of individual variation in this species. Another figure of the male is here given, and this has been drawn from a 'Discovery' specimen.

A number of specimens were taken by the 'Discovery' in Winter Quarters, all of them being extracted from sponge débris. In the roots of these organisms they made their homes. These specimens show a considerable range of variation; a typical example shows the following characteristic features. The cephalosome has a sinuous anterior margin with a very small spine in the middle line; on either side is a swelling which bears a distinct spine at its inner border not far from the middle line. Near the antero-lateral angle and just in front of the eye is a stout toothed spine; the cephalosome is depressed in the centre, but otherwise almost completely covered with small spines.

The first segment of the mesosome is a small crescentic structure squeezed in between the cephalosome and the next; the four following segments progressively increase in length, the fifth and sixth being subequal. The fourth is attached to the third by a conspicuous "waist." The first is only indistinctly spinous, the second and third, and, to a much less extent, the fourth, are strongly spinous, especially laterally, and along the posterior border in two segments at least.

The lateral margin of the fifth segment is invaginated posteriorly, the depression being occupied by a button-like process. The sixth segment is divided into two halves by a shallow transverse depression, and the posterior border, which is much arched, bears a stout tubercle laterally.

A small crescentic segment overlapping the first abdominal represents the seventh. The metasome exhibits five subequal segments with scythe-like epimera. The sixth segment is united to an acutely triangular telson, which bears a few setæ.

The uropoda are large, but not extending beyond the telson. The protopodite is stout, and its inner border is produced into a spinous projection. The endopodite is much broader than the exopodite, and both are fringed all round with long setæ. The entire body is fringed with long setæ, particularly on the cephalosome and anterior segments.

Although many of the 'Discovery' specimens are, to some extent at least, covered with a diatomaceous deposit, it never reaches that extent which it does in the 'Southern Cross' specimens. It is, however, sufficient to hide small details here and there. The variation is great, and in many cases the spinose covering is almost entirely absent, but may exist to a very variable extent. In many cases I have been unable to detect the three median spines on the cephalon as exist on the figured specimen, and the spur at the lateral angle of that structure is sometimes quite simple, at times truncate as if broken.

The crustaceous character of the mesosome is an exceedingly variable feature. Usually the first four segments show it very clearly; in the two following it is usually concealed. The fourth segment frequently has a conspicuous and quadrangular space in the mid-dorsal line, but as frequently this is quite absent. The succeeding segment also bears evidence of a median division, but often it is only partly crustaceous. The sixth segment is rarely crustaceous, but when it is the deposit is not evenly deposited. This segment only rarely exhibits the rounded postero-lateral margins so characteristic of the 'Southern Cross' species; but here, on turning the animal on to the dorsal surface, traces of the button-like process may be detected.

Numerous specimens, male and female and all ages, were taken from the roots of sponges inside the 25-fathom line. A few were taken at a time during the whole of our stay in Winter Quarters.

EUNEOGNATHIA.

This genus was separated from the more widely-known genus *Gnathia* by the Rev. T. R. R. Stebbing, on the ground that the first gnathopod of the male is six-jointed, and that the pleopods have both branches fringed with long plumose hairs.

EUNEOGNATHIA GIGAS.

Anceus gigas Beddard (1), pp. 137-9.

Euneognathia gigas Stebbing (15), p. 338.

Specific characters :—

Male.

Cephalosome short and broad, with a sinuous anterior margin and a short spur laterally.

Depressed in the centre and tuberculated externally.

Maxilliped with 4-jointed palp, setose externally.

Gnathopods 6-jointed, with long setæ externally, short ones internally.

The single specimen measures some 16 mm. in length, the same size as the *Anceus gigas* described by Mr. Beddard in the Isopoda of the 'Challenger' Reports. The following description will show that it must be identified with that species.

The cephalosome is broad, rounded postero-laterally, and has a prominent spur at the antero-lateral angle external to the antennæ and just in front of the eyes. The anterior margin is sinuous, due to fine, small tubercular enlargements. The middle one is the smallest, and is slightly indented. Its surface is rather depressed anteriorly, but abreast and behind the eyes are two prominent tubercles on each side, of which the posterior is much the larger, and this latter is separated by a smooth narrow portion from the tumid posterior margin of the cephalosome. Mr. Beddard's specimen is not satisfactorily figured. The anterior margin of the cephalosome is similar to that of the 'Discovery' specimen, but the tubercles are more exaggerated. The ovoid lobes connected with the eyes do not exist as figured, but in place of them are two prominent swellings, the surface of which is coarsely tuberculated.

The visible segments of the mesosome are smooth; the first is small, somewhat crescentic in shape and does not reach the margin of the body; the second and third are narrow and their epimera are cleft; the fourth segment is much longer than either of the two preceding. The fifth is very nearly as long as the first three together and shows indications of the median longitudinal division characteristic of many members of this family. The sixth segment is narrower but almost as long as the fourth, the postero-lateral angles project backwards as a large rounded process, the inner border of which forms a small tubercle. It is on this process that the last pair of pereopoda are articulated. The last segment of the mesosome is very small and wedged in between these processes.

The metasome comprises six distinct segments, of which the first is the shortest; the sixth terminates in a telson which is triangular in shape and acutely pointed, fringed with short setæ and with a stout one distally. The epimera are scythe-like in form and distinct from the segment bearing them.

The uropoda are about the same length as the telson.

The protopodite is short and broad and situated at a considerable angle with the last abdominal segment, and prolonged internally as a stout process with setæ at the extremity.

The exopodite is a little the narrower of the two and actually longer than the endopodite. This latter is a little broader and has its inner margin more rounded. Both are fringed with short setæ and less abundantly with long plumose setæ, especially on the inner margin.

The first antenna comprises a peduncle of three joints, the proportions being 2. 2. 5, the last being very much the most slender; this is followed by a flagellum of some half-dozen joints, of which the first is minute.

The second antenna has a peduncle of four joints, the proportions being 2. 2. 4. 5.5. The flagellum has about eight joints. In both cases the joints of the peduncles bear a few setæ distally and also along the last joint; shorter setæ fringe all the joints of the flagellum.

In Mr. Beddard's description the two pairs of antennæ are described as having an extra joint in the peduncle.

The mandibles are strong and scythe-like. Each is slightly curved, pointed distally, and has a prominent spine on the outer margin. The inner border bears two small rounded flanges to fit similar ones from the opposite side.

The maxilliped (fig. 3a) comprises a very thick basal joint, straight on its inner margin, with a series of fine setæ distally, stronger ones proximally, rounded externally and fringed with longer and finer setæ. From its inner angle of this joint there projects a thin, rather triangular joint and externally a four-jointed palp. The joints of the palp are broad and flat; the terminal one, however, is more slender; their proportions are 1. 4. 3. 2. The external margin of all these joints is fringed with plumose setæ, and there are three distally on the terminal joint.

The gnathopod (fig. 3b) is a large, tapering six-jointed structure, articulated to the body laterally and curved forwards over the mid-ventral line; it is shielded externally by a curved and projecting flange of the exoskeleton. The first joint is short and stout, only indicated in the figure; all the other joints except the terminal one are large, flat, and broad; the first of these—the second in point of size—has a fringe of small setæ externally and six rather short plumose setæ distally on the inner margin. The next joint is the largest, and its inner margin is fringed with large plumose setæ; externally there are a few small setæ distally. The three following joints are scarcely as long as the second, the terminal one being minute. Collectively they taper to a blunt point; the third has plumose setæ all along the inner margin, and small fine setæ externally, the other two have these fine setæ all around, but the penultimate one bears a group of long, simple setæ near its distal extremity.

The proportions of these joints are 4. 6. 3. 2. 0.5.

The pereopoda are all very much alike. In the first pair the second and third joints together are scarcely as long as the first, the carpus is about as long as the preceding, the propodus is longer, the dactylus is about half its size. The proportions are not quite the same on all the limbs, but in all cases the ischium and merus are expanded on their outer margin; in the merus this expansion becomes a forwardly directed lobe. Small groups of setæ occur on these swellings, and a few smaller ones are scattered elsewhere. One or two small spines may occur on the propodus.

A single specimen was taken off Coulman Island in 100 fathoms, 13th January, 1902.

ÆGA.

This well-known genus, established by Leach in 1815, now contains some twenty-five species from all parts of the world. The following species was first taken on the French Antarctic Expedition.

ÆGA ANTARCTICA.

(Plate II.*)

Æga australis Richardson (12), pp. 4–6, *not* Whitelegge, Mem. Austral. Mus. iv. (1901), p. 229.

Specific characters:—

No process on the propodus of the first three pair of pereopoda.

The enlarged endopodite of the uropoda.

This species, of which several specimens were taken, attains a length of 28 mm. and a width of 13 mm.

The cephalosome is small, its anterior margin is slightly rounded, and a stout but short rostrum projects between the antennæ; its posterior margin is rounded, but not quite evenly, the eyes are very distinct, rather small, lateral in position, and irregular in shape.

* The legend should be as above, and not as it was printed off.

The first segment of the mesosome is a little longer than the next two, and about as long as the last; it partially encloses the cephalosome up to the level of the eyes, but owing to foreshortening this is not noticeable in the figure. Its epimera are not distinctly separated off from it, and they are pointed posteriorly. The fifth and sixth segments are longest and widest. The epimera of all but the first are distinct, their external margins are curved, and they are pointed posteriorly. The entire mesosome is covered irregularly with minute punctures, not readily seen while the body is wet. The metasome is a little narrower, and only five distinct segments are visible from the dorsum, the sixth being fused with the telson, which is rather short and broad, its margins slightly curved to a blunt point, the structure being strengthened by a poorly-developed median keel. The margin is finely serrated, and each "tooth" of the serration is accompanied by a spine; the whole border is fringed with small plumose setæ.

The uropoda are large, and project but little beyond the telson. The protopodite is short and stout, having its inner border prolonged in a scythe-like manner as far as the inner angle of the endopodite. The exopodite is narrow, lanceolate, both sides of the distal half bear stout spines at regular intervals, and there is one at the extremity; almost the entire margin is fringed with short plumose setæ.

The endopodite is broader, more leaf-like in shape; it projects to the same distance. The internal margin is serrated, each serration being accompanied by a small but stout spine. These latter are also to be found on the inner margin. All the outer and most of the inner part is fringed with long plumose setæ.

The first antenna has a peduncle of three joints, none of which are dilated; the first is stout and lies at a right angle to the axis of the body, the second joint is shorter, and the third, which is comparatively slender, is three-quarters of the length of the preceding two together. The flagellum is multi-articulate and not very long.

The second antenna has a peduncle of five joints; the first is very short and stout, the second is shorter, the other three progressively increase in length, the last being scarcely as long as the two preceding ones. The flagellum is multi-articulate and half as long again as the peduncle.

The mandible is stout. The mandibular palp is three-jointed; the middle joint is the longest, and the terminal one the shortest. The inner border of the second joint bears a group of setæ near its distal extremity. These setæ are very finely toothed along the distal halves or thereabouts. The distal joint has the external margin rounded; it is fringed with stiff setæ on its straight inner border. These gradually increase in length towards the extremity of the joint, and under a high power they are seen to be flattened and slightly expanded at their extremities. At the extremity of the joint are three or four very much longer setæ armed with delicate teeth, as on the preceding joint.

The second maxilla (fig. 2) is a single elongated joint, rather expanded at the base; its inner margin is straight, and at about two-thirds of its length there is a

notch, as indicating the presence of another joint. This distal portion is rounded, and bears at its inner extremity three prominent teeth. At the notch above alluded to there is a very small finger-like joint armed with two teeth.

The maxilliped (fig. 3) is a very stout appendage. Its basal joint occupies rather more than half the length of the entire structure, the distal joint is triangular and slopes away from the inner margin of the appendage. In the palp five joints may be distinguished; the first is short and broad, the second is roughly triangular, the base being internal, the third is the largest and irregular in shape, being expanded internally. The two terminals are small, and bear three or four strong teeth and a few spinous setæ. The epignath is about three-quarters the length of the basal joint, forming a slightly rounded cone with a few setæ distally.

The first pereopod (fig. 4) is short and stout; the first joint or basis is very much the largest joint, the ischium is short, expanded distally, and forms the bend of the limb in its natural position; the merus is short and broad, bearing on its inner margin four stout stumpy spines; the carpus is equally broad, but not half the length, and bears two stout spines on its inner margin; the propodus is a little longer than the two preceding, with two strong spines and a few setæ in connection with the distal one. The dactylus is longer than the propodus, and forms a very strong curved claw; the inner margin of this for more than half its length bears a thin membranous addition to its edge.

In the two succeeding pereopoda the merus projects over the base of the succeeding joint both dorsally and ventrally, but especially the latter; the carpus also projects ventrally, in both cases forming a curved spinous structure.

The remaining four pairs (fig. 5) are also much alike, but more distinctly destined for locomotion than for prehension. Their proportions are not exactly the same. The basis is the largest and strongest joint. The ischium and merus together are scarcely as long; the former is prolonged dorsally over the latter, and the latter also, but to a much less extent. All the joints except the first have distal fringes of very strong setæ, and the ventral margin bears setæ arranged more or less distinctly as short transverse bands than in a single row. They are, however, arranged as a row on the propodus. The terminal claw is of quite moderate size but powerful.

The pleopoda are of a tolerably uniform character. In the first the protopodite is stout and very broad. The exopodite and endopodite are situated at subequal intervals from the margins and each other.

The exopodite is egg-shaped, the round end being free and thickly fringed with long plumose setæ; the endopodite has a straight and thickened inner edge and is more triangular in shape, the apex being rounded and fringed with plumose setæ.

Specimens of this species were taken occasionally throughout our stay in Winter Quarters, at depths down to 125 fathoms. The smallest example is scarcely 12 mm. long. Several more or less digested specimens were taken from the stomach of a Weddell's seal.

CIROLANA.

Another of Leach's genera, established in 1818 and now containing about thirty species from all oceans. The following species has not been previously recorded.

CIROLANA MERIDIONALIS.

(Plate III.)

Specific characters :—

Fifth segment of the metasome narrower than the preceding one, but the lateral margins are not covered by the fourth segment.

No eyes.

The total length of the animal is 35 mm., its width 15 mm. The cephalosome is very strongly marked off from the body and no trace of eyes can be discerned. Its anterior margin is rounded but slightly, excavated for the origin of the first antenna, between which there is a small rostrum, it is unevenly rounded laterally and the posterior border is incurved to a slight extent.

The mesosome is quite smooth, in life rather thickly spotted with light yellowish spots on the brown ground colour. The seven segments are distinct, the first is the longest, but owing to the curvature of the body it is foreshortened in the figure and partially encloses the cephalosome; the second is about half the length; the others, up to the fifth, progressively increase in length; the sixth is very little shorter, and the seventh shorter still. Except on the first the epimera are distinct from their respective segments, increasing in size to the fifth and, again except the first, pointed posteriorly.

The metasome comprises six segments, of which the last is fused with the telson. The first segment is very short, the others progressively decrease in width, the fourth to some extent overlapping the fifth laterally. The epimera of the four anterior segments progressively increase in size from the first and are acutely pointed.

The telson is broad and rounded, but terminating in the middle line in a small projection. Its distal margin is setose.

The uropoda are large; the short and stout protopodite has its inner angle produced as a spur and bears a narrow leaf-like exopodite setose all round; the endopodite is really about the same length but broader and similarly setose; it projects just beyond the end of the telson.

The first antenna has a three-jointed peduncle, the first is very short and stout, the second less stout and shorter, the third is as long as the other two together. The flagellum is twice the length of the last joint of the peduncle and consists of a number of stout but very short ill-defined joints. Its anterior margin bears a number of stout setae; at first sight these look to be more like spines, but they are certainly of a sensory character.

The second antenna also has a peduncle of three joints which progressively decrease in stoutness but increase in length. The multi-articulate flagellum is of some length.

The mandible is very strong and provided with a four-jointed palp. That of the left side of the animal has a straight cutting edge, bevelled anteriorly and posteriorly prolonged into a stout spur of some length. The cutting edge is hollowed out internally to receive the mandible of the opposite side, here there is no spur, and the cutting edge is cleft to form two very stout teeth. This is as examined *in situ*. The palp is four-jointed, but the first is extremely short, the proportions of the others being 5. 7.5. 3.5. The second joint has the distal half of its external border provided with somewhat specialised setæ, the longest are at the beginning of the series, and speaking broadly there are only two sizes. The terminal joint is curved, fringed throughout its inner border with stout setæ; these gradually increase in length distally and the joint terminates with three long ones.

The first maxilla (fig. 2) has a small but irregularly shaped masticatory lobe; its outer border projects forward as a broad lobe, its inner and lower border, which is rounded and considerably larger, bears three very large spinous processes; of these the most posterior is longest and most slender; each has a thick tuft of fine setæ about the middle of its length where the spine is distinct as such from its basal process. The outer lobe is large, arched towards the middle line, its margin there being almost straight. This is armed with eleven very strong spines though their length and strength is variable. At the lower inner angle there are two small spinous tubercles, one bearing^{*} five small spines arranged like the prongs of a fork, the other has only two spines.

The second maxilla (fig. 3) has a short and broad masticatory lobe; this has a slightly rounded internal margin armed with numerous long and strong setæ. Three setæ near the posterior angle are very much longer than any of the others, and become plumose by the presence of hair-like structures. The remainder of the setæ do not vary greatly in size, and all except those near the anterior angle are, to some extent at least, plumose. Two lobes arise from the outer part of the masticatory lobe, the inner one is the broader and of an elongated ovoid form; the inner border and distal extremity is provided with long and stout simple setæ of two distinct sizes, and form two rows along the inner margin. The outer lobe is narrow and terminates with four long simple setæ and two smaller ones.

The maxilliped (fig. 4) is remarkable for the disproportion between the masticatory portion and the palp. The former comprises a short but stout joint, the inner margin of which is rounded proximally, and this is followed by another short joint which has a straight inner margin, and from its distal inner angle it slopes rapidly to a much shorter slightly rounded external margin; the inner distal margin carries four stiff plumose setæ, and near these is a single prominent tooth. It is behind this that the first joint of the five-jointed palp lies. The joints of this

appendage are all very short and broad and thickly bordered on both sides with long simple setæ, some of which on the inner margins of the last two joints are distinctly spinous. The third and fourth joints are much expanded internally, and the fifth is a very broad stumpy joint. The second joint has short stout setæ on its distal margin. The epignath is a very small rounded plate external to the basal joint.

The pleopoda are approximately uniform in structure. The first has been removed for examination. The protopodite is short and broad; its external margin projects as a short, stout backwardly directed process, the inner margin is rounded and bears a dense fringe of short plumose setæ, among which are a number of spines. The exopodite is a pointed egg-shaped structure, attached near the point; its external and distal margins are densely fringed with rather long plumose setæ. The endopodite is directed inwards from its attachment and then bent at a right angle, the anterior and inner edges being thickened and straight; they are fringed with fine setæ, which ultimately become long and plumose around the distal third of the joint. The inner edge is rounded.

The pereopoda are all very much alike. In the first (fig. 5) appendage the basis is the largest joint and rather scantily fringed with long setæ along its dorsal margin. This fringe is double, that is to say, dorso-lateral. A strongly developed distal fringe occurs ventrally, the ischium is a short joint and its dorsal margin projects as a shield over the next joint for some distance; this shield is fringed with long setæ; a row of setæ occurs along the side of the joint near its end; a group occurs about the mid-ventral region and a row occupies the more distal portion; the merus is very short if measured along its ventral margin, but dorsally it projects quite to the middle of the propodus; this projection bears numerous long setæ; the ventral margin bears some four or five strongly developed spines and several weaker ones of irregular size. The carpus is quite a small joint, roughly triangular in shape, the distal half of its ventral margin is fringed with spines, which increase in strength and size distally, the dorsal margin is reduced to a minimum; the propodus is stout, slightly curved, with four spines ventrally. The daetylus is strongly developed, more than half the length of the propodus.

The other appendages are built on exactly the same plan, differing only in the strength and abundance of the spinous or setose armature. The four anterior pairs conform most distinctly to this type; in the remaining three the propodus is longer and more slender and the daetylus shorter.

The dorso-lateral fringes of setæ on the bases of the more posterior appendages become very strongly developed. The sixth appendage is typical of the other extreme of variation (fig. 6). The basis has two dense dorso-lateral fringes of plumose setæ, a few arise ventrally just beyond the middle of its length, while distally they form a dense tuft. The ischium is articulated at the dorsal angle of the basis; it is rather more than half its length, and the so-called dorsal shield projects but very little—it is scarcely prominent—the merus is two-thirds the length of the ischium, and the

dorsal shield is small and inconspicuous. The carpus is scarcely as long and much more slender, the propodus is longer and still more slender, the dactylus is rather short. There are but few spines properly so called on this appendage, the merus, carpus and dactylus bear several as distal fringes or on the ventral surface of the joint, which are of a distinctly spinous character. The setæ on the ischium, except those dorsally situated, are indistinctly plumose, elsewhere they are simple.

A single specimen of this species, a female, was taken in the traps in Winter Quarters, 29. 8. 03. in 25 fms. Another, mutilated, example was found in a seal's stomach, 31st January, 1903.

SEROLIS.

This genus was established by Leach in 1818 and now contains twenty-four species, nearly all of which are from the southern hemisphere.

SEROLIS TRILOBITOIDES.

(Plate IV.)

Serolis trilobitoides Eights (6), pp. 53-57.

Brongniartia cornuta Studer (17), pp. 21-24 ; Beddard (18), pp. 49-53.

Specific characters :—

Body broadly ovate, with large serrated epimera curved backwards, the sixth thoracic segment not extending much beyond the insertion of the uropoda.

Cephalosome with well-developed eyes, two swellings between them having the posterior margin three-lobed as the adult condition is reached.

Urosome pentagonal, margin dentate from the insertion of the uropoda, a median dentate keel terminating in a short caudal spine. On each side an oblique ridge terminating in a tooth near the insertion of the uropoda. Two teeth separated by a small recess in the middle line before the beginning of the median keel.

Special spines on the propodus of the second thoracic appendage consisting of sensory teeth alternating with broad leaf-like sensory structures, of which the blade is unequally developed on the two sides of the shaft.

The body is nearly circular, the largest specimen measures 48 mm. in length and 43 mm. in width. If the basal joints of the antennæ, which are directed forwards, be included the length of the animal is increased to 53 mm. The epimera are large with a finely serrated external margin, all more or less curved backwards; those of the sixth thoracic segment reaching nearly to the end of the caudal shield. Those of the abdominal segments terminate just in front of this and are subequal. The posterior margin of each of the thoracic epimera bears a tubercular swelling at about one-third of its length. The urosome is pentagonal in outline, its free margin from the insertion of the uropoda is beset with numerous pointed teeth and terminates in the middle line in a stout spine. In the larger specimen this is broken, but, judging from the smaller one, it should be about 3 mm. long. The middle line of the urosome is marked by a prominent ridge bearing seven teeth of variable size; the first is the largest and the posterior ones are the smallest. In front of this ridge, at the junction of the caudal shield with the third abdominal segment, there is a prominent lip which

bears two* teeth separated by a rounded recess. Close to this rises a ridge on each side, which runs outwardly to end in a stout spine above the point of insertion of the uropoda. The cephalosome is about one-fifth the length of the body, it is separated off from the epimera of the first thoracic segment by a very distinct groove, which passes forward in a slightly curved line just outside the eyes. The anterior margin is bevelled to receive the first antenna, and presents three crescentic depressions, of which the median one is the largest, and further subdivided by a small median tubercle between the antennæ. A median plate with rounded angles lies between the eyes anteriorly, and behind it most of the space is raised into two irregular and flattened enlargements with their posterior margins rounded, a median lobe on each side being conspicuous.

Between and behind these enlargements is a narrow plate with a small dark tubercle in the centre. The eyes are prominent, large; except anteriorly they are separated off from the two tuberculated enlargements alluded to above by a deep groove. The cornea is oblong, lunulate, and composed of a large number of small facets. The first thoracic segment is separated from the second by a line of segmentation, distinct enough at its origin, but which dies away before it reaches the margin. The anterior margin of these two thoracic segments, like that of all the epimera, is minutely serrate. The last thoracic segment is invisible from the dorsum, and the first abdominal, which is without epimera, is enclosed by the arching forwards of the seventh thoracic. Only on the third, fourth and fifth thoracic segments are the epimera distinct from the thorax.

Eights' specimens attained a greater size than the largest obtained by the 'Discovery,' and measure 70 mm. \times 57 mm., and an adult male is figured both from the dorsal and ventral aspects. Dr. Studer's specimens obtained from Kerguelen Island are not half this size, and those obtained by H.M.S. 'Challenger' from the same locality are intermediate, the largest being a female measuring 41 mm. \times 35.5 mm.

For his specimens Eights describes and figures a ridge running obliquely backwards from the inner border of the epimera of the first thoracic segment towards the middle of its posterior border, before reaching which, however, it dies away. This is the only difference I can find between his specimens and those taken by the 'Discovery' when viewed from the dorsum. The dark coloured tubercle Eights regards as a possible ocellus; I am unable to make any statement on this point, this structure being injured in the larger specimen. Dr. Studer ignores it altogether, Mr. Beddard figures but does not refer to it.

Dr. Studer accentuates the fact that, in his specimens, the enlargement between the eyes forms conical tubercles, a single one on the inner side of each eye, instead of a diagonal row. The "diagonal row" is an expression due to a defect in Eights' figure, and Dr. Studer's fig. 2 might be a copy of Eights' as regards this particular feature. The point at issue seems to be whether these enlargements each form a

conical tubercle (Studer, Beddard), a rounded tubercle ('Discovery'), or as Eights words it the entire space is elevated to form "somewhat the figure of a corona in high relief." The description and figure are not too explicit, but it does not appear to be a matter of vital importance. Dr. Studer further points out that the median ridge of the caudal shield bears three teeth only, the first of which is the largest. His figure from its great breadth is probably that of a female.

Mr. Beddard gives much better figures of this species, and increases the number of teeth on the keel of the caudal shield from three to six.

From the sizes of the specimens obtained in these collections it would appear that the greater number are not adult. Eights' specimen, as figured, unquestionably is so; the larger 'Discovery' specimen is approaching that condition. In reply to an enquiry, my friend, Dr. Calman, confirms my suspicion that the 'Challenger' specimens are not adult, the largest female, which has been partially dissected, bears traces of having had oostegites, in the others they are quite rudimentary. None of the males have the third thoracic appendage modified.

The sternum is quite smooth, that of the first thoracic segment which bears the maxillipeds is narrow and enclosed by the succeeding one. It projects forwards in a conical manner between the maxillipeds and bears a median ridge. The second passes completely across the body, the epimera being separated by a groove.

In the middle line the median keel of the preceding segment is continued through half its length, where it widens out and disappears; behind this is a groove which forms the anterior boundary of a lip-like structure rather more than 5 mm. wide. The three following segments are conspicuously divided in the middle line, the remainder less distinctly so. The sixth is only indistinctly separated from the following, while the seventh and eighth are fused.

The posterior border of the first three abdominal segments is, in the middle line, produced backwards into a spine. Small in the first, it is but little larger in the second, but in the third it is very much larger. This feature is alluded to by Mr. Beddard as a sexual character, but one which is not constant in all species. For this particular species it is not alluded to either by him or Dr. Studer, and Eights' figure is not satisfactory in this respect. What I take to be the genital apertures are two small ovoid slits near the posterior border of the last thoracic segment and some little distance from the middle line. Mr. Beddard states that these apertures are invariably circular in the male, but neither he nor Dr. Studer allude to them for this species. Eights is equally silent on this point.

The first antennæ rise in a depression of the anterior margin of the cephalosome, and are directed outwards. Each consists of a tapering four-jointed peduncle, the proportions of these joints being 3. 5. 4. 2.5, and they are followed by a multi-articulate flagellum.

Dr. Studer states that the flagellum has twenty-two joints, Mr. Beddard states twenty-five. In all the 'Discovery' specimens the flagellum, although injured,

contains more joints than quoted by either of these observers. The peduncle and most of the joints of the flagellum show markings as of imbricated scales, and having at short intervals very delicate aborescent chromatophores. The joints of the flagellum each bear a tuft of a few setæ and a sensory seta. This is a rather long thin structure containing granular matter and mounted on a short but stout peduncle. Owing to injury it is difficult to make out the details of its structure, but in a few cases they appear to be identical with Mr. Beddard's figures.

The second antennæ have five-jointed peduncles, in each case the first joint is not visible from the dorsum and is small; this and the second are directed forward, the third being articulated at a right angle; this and the two following are grooved longitudinally, the proportions of the various joints being 1·5. 3·5. 5. 8. 11. The multi-articulate flagellum is not as long as the terminal joint of the peduncle. The margin of the peduncle is fringed with setæ, small and fine ones singly, longer ones in small tufts at intervals. The joints of the flagellum number sixteen, in agreement with Mr. Beddard, and have the appearance of being covered with imbricate scales, irregularly hexagonal in shape; along the centre joints there is a row of teeth, those figured by Mr. Beddard do not give an adequate idea of their structure. They occur on the fourth to the tenth joints inclusive, and consist of a strong tooth directed forwards, its posterior margin being produced into a thin blade like a knife edge.

The flagella of both antennæ are fringed with extremely minute spines.

The upper lip or epistome is triangular with its angles rounded, the broad base being posterior and straight, with the exception of a slight indentation in the middle line.

The anterior borders are enclosed by an independent but narrow ridge. The epistome itself bears two circular depressions, a fact noticed by Eights, but his figure as regards this structure is not good.

The mandible is very strong, and has a stout base directed obliquely inwards; a blunt process on its anterior margin marks the point where it turns to the middle line, tapering to end in a stout cutting edge. This edge is strongly coloured, and the left mandible, viewed externally, exhibits two small tubercular teeth with traces of a third; some little distance from the cutting edge there projects from under the posterior margin a tubercle belonging to the inner series, and behind this a rather long bifurcated spine. Internally there is a second cutting edge which comprises three stout tubercles and two small ones between and a little behind the first and second. Another weaker ridge lies behind this, and from the posterior end of it the bifurcated spine arises.

The palp is long and three-jointed; rising from the outer angle at the base of the mandible two joints lie in front of the epistome, the third being directed straight forwards between the antennæ. The proportions of the joints are as 5. 8. 3·5. The first joint bears a single long seta of simple structure, the second bears several, but at its distal and ventral extremity they become highly specialised. The last joint is a flat blade with a rounded dorsal margin and nearly straight ventrally. The

ventral margin is nearly completely occupied by the same highly specialised setæ. Here they graduate in size to the distal extremity, where they rather quickly become much larger than elsewhere. These setæ (fig. 3) consist of a shaft with very finely granular contents, the shaft tapers and ends in a blunt point, which in certain aspects appears to be an elongated knob. Both margins are fringed with very delicate flat teeth, very close, in fact contiguous to one another. These appear to be set on the shaft at an angle so as to form the limbs of a V, of which the shaft forms a very broad base. The ventral margin of the second joint is very minutely dentate. None of the authors previously cited deal with this appendage in any detail. Eights describes the left mandible as having "two corneous teeth, placed one within the other, that on the right contains but one; they are convex externally and internally concave, with a small foramen at their base." This latter statement I do not understand. As regards the palp, he states the two basal joints are subequal in length and the terminal one about half the size. Dr. Studer states that the cutting edge is divided into two ridges and bears no teeth, but only sharp undulating edges. This figure is not good; he omits almost all the setæ on the terminal joint of the palp, but in the comparative sizes of the joints they more closely resemble the 'Discovery' specimens. The only reference I have seen to the highly specialised setæ is contained in Dr. Pfeffer's description of *S. septemcarinata* (11), and he figures them for that species as being plumose to within a short distance of the enlarged end.

The first maxilla (fig. 4) consists of two lobes. The inner one is very small and delicate, the outer one large and strong. The inner one is irregularly ovoid upon a short peduncle, the outer one is stout and slightly curved. Its cutting edge is hollowed out to some extent, and the margin is fringed with stout spines of variable length, but the largest are most anterior. In the specimen examined there are eleven of these. The dorsal margin of this joint is covered with very minute teeth, which are replaced by simple setæ about the middle of its length.

The second maxilla (fig. 5) is more delicate in structure, and comprises a thin but broad inner lobe, rounded distally and there provided with upwards of thirty specialised setæ. About two-thirds the length of this lobe there arise externally two lobes of approximately equal size. It would, perhaps, be correct to say a single bifid lobe. Each of these lobes is armed distally with two stout specialised setæ, similar to, but much stronger than, those of the inner lobe. The setæ are all pedunculate. A central core runs continuously through the peduncle and shaft, and the latter is covered with a number of very minute but stout spines.

The maxilliped (fig. 6) consists of a short but very broad sub-triangular plate, which carries the large masticatory lobe, and an approximately rectangular epignath. The inner margin of the masticatory lobe is straight, rounded towards the base, where there is a group of rather long simple setæ, and a few other small ones are scattered along it. The anterior margin is nearly straight, and bears a stout tooth near each angle. The outer tooth is situated in rather a deep depression. The outer margin

is rounded. The palp is three-jointed. The first is very small, the second large, cordate in shape; the third is a rather short and broad lobe, articulated nearer to the outer portion of the second. The inner margin of the second joint and the extremity of the first are richly clothed with simple setæ. A few other small ones are scattered along the other margins, and also irregularly over the surface of the entire palp, masticatory lobe, and distal portion of the epignath.

Eights' description of this organ is not easy to interpret exactly, but as far as it goes it agrees with the above, except that a single tooth is only mentioned as occurring on the masticatory lobe. As the second may be easily concealed by the palp, this is of small moment.

The descriptions given by Dr. Studer and Mr. Beddard are very concise. The figure given by the former is very crude and incomplete, though fairly correct as far as it goes. Mr. Beddard's figure is very much more correct and detailed. Only one tooth is figured, the position of the second being covered by the palp. The basal plate is, however, figured as being divided. I have not been able to detect the existence of such a division even with a $\frac{1}{6}$ objective; bands of muscle interfere greatly and render its determination difficult.

The first appendage of the mesosome is subchelate and comprises six distinct joints, the first of which is subequal in length to the last but one. The three following are all very short, and two, the more distal ones, have a very irregular shape. These three short joints all bear a tuft of somewhat specialised setæ, which are numerous only on the third of the joints, and this one, with the second, bears a number of very minute teeth on its inner margin, the third having in addition two stout teeth and a third much smaller one. The propodus is large and ovate in shape, its inner margin being flattened to form a blunt knife edge and provided with a series of very highly specialised structures, which have not been described for this species, notwithstanding the fact that they afford valuable specific characters. Eights describes the margin of this joint as ciliate. Dr. Studer remarks that it is provided with lancet-like teeth, and figures five joints of this appendage, but on so small a scale as to be worthless. Mr. Beddard does not refer to this appendage except in very general terms. The specialised structures (figs. 7 and 8) consist of a regular series of stout teeth, and alternating with them are leaf-like blades, both being obviously of a sensory nature. The teeth have a strongly-marked "midrib," which, however, is not quite straight, and terminates in a delicate elongate sensory structure. The blade is very faintly striated, and terminates in an irregular manner, to allow the sense organ to protrude. The "leaf-like" organ also has a distinct "midrib," but the blade is very unequally developed on the two sides, and exhibits a much coarser striation than the tooth. The "midrib" terminates in precisely the same way and in a similar sensory structure.

Of the remaining appendages of the mesosome four progressively increase in size, the second to the fifth; this and the sixth are subequal in size, but the seventh is much smaller, but in the larger of the 'Discovery' specimens the greater part of most of these

appendages are lost ; they are, however, uninjured in the smaller specimen. The first appendage of this series, the second of the mesosome, comprises six joints, the first of which is large and stout, the rest progressively decrease in size, and all are liberally provided with small arborescent chromatophores. The second joint has two serrations on its outer or ventral side, at each of which are a few long setæ, distally, both ventrally and dorsally, but not laterally ; there is also a distal fringe of long setæ ; the following joint has a single serration, the next has three, and the setæ connected therewith are distinctly spinous ; the penultimate one has seven of these so-called serrations, but very small at first, increasing in size distally ; the setæ they bear are very small at first but increase to long ones distally, on the opposite side of the joint the distal fringe is long and spinous. The ventral margin is slightly expanded and flattened as a blade, chiefly proximally. The sixth joint or dactylus is stout and capable of folding on the preceding one in a subchela manner. *This appendage constitutes a secondary sexual character in the adult animal where it becomes modified to form a prehensile organ, and differs considerably from the remainder which are distinctly locomotive in function. As such it is figured and very briefly described by Eights. For this species or *S. cornuta*, neither Dr. Studer nor Mr. Beddard give any description of this appendage as distinct from the others, though both refer to its modification generally among members of the genus. From this and other circumstances as previously indicated it may be assumed that their specimens were immature. The other thoracic appendages are alike in structure, the propodal joint is slender and not in any way expanded, nor does the dactylus appear capable of being reflexed upon it in a subchela manner. The spinous armature varies with the size of the limb or the joint where it occurs, and the last appendage of the mesosome only differs from the others in size.

Of the abdominal appendages the first three pairs are adapted for swimming. The base of each limb is roughly in the form of a truncated cone directed towards the middle line, and articulated to the sternum near one corner of the narrow base which is curved outwards ; this angle bears three stout setæ on the first and two on the remaining appendages, other fine setæ fringe these joints throughout.

The exopodite is a delicate semicircular structure fringed with fine setæ, and on its curved border with long plumose setæ. The endopodite is smaller and attached to the protopodite at about two-thirds of its length ; this shows more distinctly a ribbed structure, each rib corresponding to a long plumose setæ. The three pair of appendages do not differ materially in shape or structure except that the straight posterior border is prolonged into the "penial filament." This is a slender rod-like body passing towards the middle line, it then bends somewhat abruptly backwards, and is grooved on its inner side. It is about 4.5 mm. long, and appears to be jointed at the bend ; but this is probably due to injury, as there is no trace of such a structure in the smaller specimen where, moreover, this organ is very much smaller. This organ of the larger specimen is very much smaller than that indicated in Eights' figure. In their description of *S. cornuta* neither Dr. Studer nor Mr. Beddard allude to it.

The pleopoda are four paired structures occupying the entire area below the caudal shield. Each pleopod consists of a very broad and short basal joint bearing an exopodite and an endopodite, which lie over one another, the exopodite being the outer or more ventral structure. The exopodite of the first gill is the largest and coarsest in structure, forming an operculum over the rest. The plate is obliquely divided into two by a suture, and its stout straight inner margin is thickly fringed with fine setæ; the outer margin, which is rounded anteriorly and wide, tapers slowly to a blunt point and is fringed with rather long plumose setæ. The endopodite is much more delicate, rather smaller, having no setæ whatever, and it is not divided, though its outer margin bears a conspicuous notch where the division should be. The posterior gill is shorter and broader than the preceding one; the exopodite is obliquely divided, but the only setæ it bears are a few of both kinds at the distal extremity; the endopodite resembles that of the first gill.

The uropoda are attached to the caudal shield where the edge becomes dentate; the basal joint is short, expanded distally, and prolonged on the inner side into a spinous process. The exopodite is two-jointed, the terminal one being scarcely half as long as the other, pointed, and having two serrations on the outer side and two spines on the other. The endopodite is a little longer than the first joint of the exopodite, and its external margin is serrate and has a few setæ in addition; the internal margin is also serrate but only distally.

Two males and fragments of two others, sex uncertain, were taken by the 'Discovery' in lat. $67^{\circ} 21' 46''$ S., long. $155^{\circ} 21' 10''$ E., 254 fathoms, bottom mud. The trawl passed over a patch of stones probably dropped by some wandering iceberg, and brought up so large a quantity of these that the specimens were very severely damaged, and the trawl had to be slit up completely to save anything.

Both Dr. Studer's and Mr. Beddard's descriptions of *Serolis cornuta* are defective in many points. The niceties of specific discrimination as now understood were altogether unknown in Eights' day. Almost invariably the defects of previously published descriptions are those of omission rather than commission, and going through them exhaustively with the 'Discovery' specimens before me, I have no hesitation whatever in definitely stating that the 'Gazelle' and 'Challenger' specimens are immature specimens of *Serolis trilobitoides* Eights, and that the 'Discovery' specimen is only just arriving at the adult stage.

CYMODOCELLA.

Pfeffer (11), pp. 109-110; Hansen (7), p. 107.

The following definition of this genus is by Dr. Hansen—

Both sexes similar without processes.

Distal part of the abdomen somewhat produced, with the lateral walls bent strongly downwards and inwards, constituting rather a long tube open at both ends and with a slit on the lower surface.

Uropoda similar in both sexes, rami lamellar, exopodite considerably shorter than endopodite.

Mouth parts similar in both sexes.

Male with appendix masculina on the endopodite of the second pleopod.

Marsupial lamellæ overlap each other somewhat, the brood in an exceedingly large external pouch and in the marsupium.

CYMODOCELLA TUBICAUDA.

Cymodocella tubicauda Pfeffer (11), pp. 110–115.

Spharoma egregium Chilton (2), p. 209.

Cymodocea antarctica Hodgson (8), pp. 243–245.

Cymodocella egregia Hansen (7), p. 126 ; Richardson (12), p. 7.

This species was first described by Dr. Pfeffer from specimens taken in South Georgia. It was then found by Dr. Chilton in New Zealand—the South Island ; more recently it was taken by the ‘Southern Cross’ Expedition in the Auckland Islands.

On all these occasions it has been more or less perfectly described as a new species. It now turns up off the Antarctic continent at Cape Adare, and it is hoped that its identity is now fully and permanently established. As my description of the animal was so unsatisfactory it is here re-described. It is a little unfortunate that both Dr. Hansen and Miss Richardson have made use of Dr. Chilton’s name for the species. That of Dr. Pfeffer has a priority of five years.

Specific characters :—

Body vaulted, cephalosome short, with small dorso-lateral eyes.

Antenna invisible from above.

Pereiopoda ambulatory, first the shortest, the remainder very slightly increasing in size, armed with a stout curved claw on the dactylus and one, occasionally two, stumpy accessory ones.

Metasome, always with one distinct segment, and two others imperfectly separated dorsally ; a pointed tubular urosome.

The cephalosome is small, rather broad but short, the anterior margin, seen from above, is rounded, it bends downwards and terminates with a small rounded rostrum between the antennæ ; the lateral margins bulge for the reception of the small eyes which are postero-laterally situated ; the posterior margin is incurved. It is about two-thirds the diameter of the first segment of the mesosome.

The mesosome comprises the normal seven segments of which the first is the longest and largely envelops the cephalosome, the epimera are large, ending posteriorly in a blunt point. The succeeding three segments are subequal in length, with rather small irregularly rounded epimera. Of the three posterior ones the first is a little shorter than the others. The epimera are larger and project backwards, the last of the three segments is narrower than the rest, and the posterior border of the epimera rises abruptly from its segment. In no case are the epimera separable from their respective segments.

The metasome comprises three or four segments and a urosome, a circumstance which does not seem to depend upon age. In many individuals of varied size, and therefore presumably of varied age, a short segment is to be seen between the backwardly projecting lobe of the epimera of the last segment of the mesosome. This segment is very often undeveloped or concealed. Another segment has a peculiar posterior border; it passes across the mid-dorsal line and at some little distance from it it forms an angular projection backwards, and then on in a slightly sinuous line to the epimeron. Just outside the angular projection two lines pass forward in a crescentic manner to lose themselves after a short course. This proves the segment to be incompletely divided into three.

The urosome is as long as the five posterior segments of the mesosome; it tapers posteriorly, and the lateral margin is inflected so that it terminates as a spout with an oblique orifice, and the pleopoda lie in a sort of pocket. The inflected margins are not fused distally, a narrow groove separates them.

The uropoda are conspicuous but not very large, not reaching the extremity of the urosome. They arise from a notch near its anterior border and possess a stout protopodite; the exopodite is much smaller than the endopodite, of which the inner half is much thickened; both are lanceolate in form. The endopodite is larger in proportion and somewhat more angular in some of the smaller specimens.

The antennæ are completely ventral in position, the first lies naturally in a groove between the cephalosome and the epistome.

The first antenna has a very stout peduncle of three joints. The first is as long as the other two together, very stout and bent at the base; the second is equally stout but short; and the third is much more slender and a little longer; the flagellum consists of six joints.

The second antenna is larger than the first and rises quite close to and underneath it; the peduncle is three-jointed, the three progressively increasing in length; the flagellum comprises eleven joints, each of which, except the first, has a couple of tufts of specialised setæ on the ventral surface.

The buccal mass is rather prominent, and the epistome is triangular in shape with a wide and shallow piece taken out of the base.

The mandible is strong, curved and tapering, but with a sinuous margin; the cutting edge is reduced to a blunt point, bifid, to form two strong but short teeth; on the inner side and a short distance from this is a group of stout spines. The molar process is stout, rather long, and forms a broad cutting edge.

There is a three-jointed palp, the first two joints of which are subequal, the third is shorter. The second has half-a-dozen strong spinous setæ distally on its inner margin, and the third has a series beginning about one-third of its length, at first small, but the distal ones are very long.

The first pair of maxillæ consists of two long slender lobes united at the base by a connecting piece; fully one-half of the inner lobe is imbedded in muscle; the

exposed part is a narrow, rather tapering band, terminating in four stiff plumose bristles; the outer lobe is much broader and terminates in four strong teeth and some half-dozen smaller pectinate ones.

The second pair of maxillæ is elongate, the inner lobe is broad, very slightly tapering and curved backwards; the inner border is fringed with fine setæ and distally with plumose bristles. Of the two outer lobes, the inner one is a little the broadest; both terminate in long plumose bristles.

The maxilliped is long, divided into two equal halves as regards length. The inner margin is straight throughout; the basal half tapers in a sinuous line to about half its diameter; the distal half is narrow, rounded externally, distally armed with numerous and thickened plumose bristles, one papilliform tooth, and at least two of these bristles occur on the inner margin. The palp is five-jointed; the first joint is small; the second is the longest and has distally a long stout digitiform process armed with setæ; the third joint is short, its process a little larger than the preceding and occupies the whole joint. The fourth is twice as long and a smaller process is directed forwards; the terminal joint is slender and setose. The epignath is of moderate size, about half the length of the basal joint and ovoid in shape.

The pereiopoda are all very much alike and of quite simple structure; the first is the shortest and stoutest, the second is a little longer, and from this onwards they progressively increase in size to the last; the increase is, however, very small and chiefly concerns the first two joints. Of the first pereiopod the basis is stout, constricted immediately beyond its articulation with the body; the ischium is more than half the length; the merus is short and considerably expanded dorsally to form a sort of shallow cup for the carpus; this joint is very small, triangular in fact, its dorsal margin being reduced to a minimum; the propodus is a stout joint, third in point of size, and its proximal end is in contact with the merus dorsally. The dactylus is half the length, stout, and carries a curved nail distinctively marked off from the joint, and immediately underneath is a small but very stout accessory claw. A few setæ occur distally on all the joints except the first two; on the carpus and propodus there is distally and ventrally a single stout denticulate spine, closely resembling those on the ovigers of many Pycnogonids.

In the remaining appendages the basis increases a little in length, the ischium increases more, so that on the last appendage it is nearly as long as the basis. The merus is larger than on the first limb, but very little larger than the carpus; both these joints are dilated distally, the former retaining its forwardly directed dorsal lobe; the propodus remains a simple cylindrical joint, and the dactylus stout and curved, discoloured, and provided with a small but very stout accessory; sometimes there is a second. Setæ occur distally on all the joints and occasionally elsewhere. There are no denticulate spines.

The pleopoda. The first pair comprises a very short and broad protopodite. The

endopodite has a broad base, a straight inner margin, the greater part of which is covered with fine setæ. The inner margin tapers to a rounded apex, which is provided with long plumose setæ. The exopodite is a little longer, much more delicate, ovoid in shape, fringed distally with long plumose setæ. Where the exo- and endopodites do not overlap the endopodite is very stoutly built.

The second pair, the endopodite, is similar to that of the first, but quite without any thickening; the exopodite is very much smaller, ovoid, and the plumose setæ occur throughout the outer margin as well as distally. The appendix masculina is a narrow structure of almost uniform diameter; it is slightly curved and enlarged near the distal end. On the inner side of this enlargement and on the outer side of the rounded extremity are series of very minute, backwardly-directed spines; it is longer than the endopodite. The third pleopod is like the second, but the inner margin of the endopodite is slightly strengthened.

The fourth pair has the exo- and endopodites subequal in size, heart-shaped, with a shallow notch near the apex; they are thicker and more fleshy than the preceding; they carry no setæ. Both endo- and exopodites have an oblique fold in passing from the antero-exterior margin towards the postero-lateral margin. The fifth pleopod is rather larger than the preceding. The endopodite is more irregularly cordate and has an oblique fold. The exopodite is larger and two-jointed, the second joint being about one-fifth the length of the whole and terminates in a blunt but thickened point. Another similar thickening occurs about the middle of its inner border and close to it, and on the main joint is a further thickened knob. A ridge runs from this along the inner border of the first joint for some distance and passes straight on inside a lobe of the exopodite.

A rather large number of specimens were taken at Cape Adare on February 24, 1904, from the root of a large laminarian *Lessonia grandifolia*, taken in 17 fms.

ANTARCTURUS.

The genus *Arcturus* was established by Latreille in 1804, and since that time it has received a very large number of species, chiefly from the Southern Seas. Now, however, the genus is to be broken up. Dr. zur Strassen has begun the operation and separates the northern species which contain the type, from the tropical and southern forms on the ground that in the type species the mouth parts are concealed from a lateral view, and that the dactyli of the anterior pereopoda are comparatively very small. In the southern species the mouth parts are distinctly visible from a lateral aspect, and the dactyli of the anterior pereopoda are large. For these the genus *Antarcturus* is instituted, and this contains the greater number of species. It is probable, however, that it is only a temporary delay in the further breaking up of the original genus, and if this alteration is to be carried on, minor characters, such as the

absence of cephalic horns, may be found which will assist in further dividing the original genus; but, unless these divisions are indicated by some prefix to the name *Arcturus* so as to show what has become of closely related forms, no advantage can accrue to zoological nomenclature.

ANTARCTURUS ADAREANUS.

(Plate V., fig. 1.)

Arcturus adareanus Hodgson (8), pp. 249-250.

Specific characters :—

A small spine at the antero-lateral angle of the cephalosome, and a pair of stout spines behind the cephalic horns.

Two dorso-lateral spines on the first segment of the mesosome.

This species is very closely allied to *A. glacialis* Beddard, but may be readily distinguished from it by the characters given above, and especially by the first named.

The cephalosome has its anterior margin incurved as usual, and its antero-lateral angle terminates in a spine; a minute spine occurs behind this and in front of the eyes. The cephalic horns are not very large, they lie between the eyes and arch slightly outwards. A short distance behind them is another pair of small spines. The cephalosome is otherwise smooth.

The mesosome is covered with small spines throughout. The first four segments progressively increase in length to a slight extent. The posterior margin of each segment consists of a transverse ridge, which, in the case of the first three, widens out laterally to the full length of the segment. The dorsal area in front of the ridges is occupied by two more or less distinct rows of spines. The ridge on the first segment also bears two stout but blunt spines dorso-laterally, and the posterior border of the two following segments at least has a distinct row of small spines, laterally the segments are covered with several small blunt spines. The fourth segment is similarly covered, but here the lateral area is distinct from the transverse ridge. The three posterior segments progressively decrease slightly in length; each has a raised transverse spinous ridge, which, in the case of the first, widens out laterally, both anteriorly and posteriorly; in the case of the other two the ridges are straight anteriorly and widen posteriorly. Small blunt spines are numerous. Laterally the epimera form prominent swellings over the base of their respective appendages and are more or less well supplied with small spines.

The first three segments of the metasome are distinct though fused and covered with the same small spines. The epimera are comparatively large, roughly ovate structures, decreasing in size from the first to the third. The urosome is rounded, and at its extremity bears two prominent straight spurs. Its surface is covered with small spines which are seen to be in rows. A median row of small spines, a row of larger ones on either side and two other rows less distinct. The uropoda are large, the basal

joint has three rows of spines along its centre, its extremity is truncated and carries the very small pointed terminal joint.

The above description is taken from a rather small male. The female differs considerably in the anterior part of the body. This, as is usual with all members of the genus, is considerably swollen, a fact which of course involves the proportions of these segments. The spinous armature of the body is much more strongly developed, the small spines are rather larger and much more numerous; the first segment of the mesosome has a pair of dorso-lateral spines which are conspicuously larger than the rest, and on the second segment there is one smaller than on the first, on the third segment also, and that not very much larger than the surrounding ones.

The epimeral spines are generally more developed, and at the base of the fourth pair of appendages there is a stout spine directed to the mid-ventral line. This is not present in the male, and is apparently a secondary support to the brood pouch, which is composed of four pairs of oostegites.

The first antenna is of normal type. The first joint is stout, with a blade-like expansion along its inner margin. This is covered with minute stiff setæ. The second joint is not so long and slightly swollen towards the distal extremity, the third is sub-equal in length and cylindrical, and the flagellum, which carries some sixteen tufts of specialised setæ, is rather longer than the two preceding joints together.

The second antenna has, as usual, the two first joints extremely short, the proportions of the remainder with the flagellum are 4. 8. 10. 8. The third joint has a series of stout spines along its outer border and long setæ on the inner ventral border; the next joint is similarly provided, but here the spines are smaller and diminish to nothing during its proximal half. The last joint, a flagellum, bears small setæ, but these are not thickly distributed.

The mandible is massive and thickly pigmented with arborescent chromatophores. About half its length it is bent at a right angle. Its anterior margin is prolonged as a toothed edge; it bears two teeth, and passing obliquely backwards from the most anterior of these are two quite small ones; the posterior edge of this part is another very prominent tooth, and below this again is a group of spines arranged somewhat radially. The cutting edge is straight and broad.

The first maxilla comprises two lobes, the inner one, short and slender, slightly curved with fine setæ along its inner margin; its truncated extremity bears three stout spinous setæ with fine ones along them, rendering them coarsely plumose. The outer joint is stouter, double the length, with fine setæ externally and terminates in a crown of nine or ten stout spines.

The second maxilla has its inner lobe short and broad, with fine setæ along its internal margin. Distally the extremity is rather rounded and armed with plumose spines. Three of these plumose spines on the outer side of this lobe are much finer than the others. Of the two lobes the inner one is the smaller and terminates with three long slightly plumose spines. The outer lobe is much stouter and carries five of

these plumose setæ, but here they vary in length, and on both lobes the plumose structure exists only at the base, distally they become finely toothed.

The maxilliped does not exhibit any special features. The basal joint is short with the outer angles, particularly the anterior one, rounded. The masticatory lobe is long, two-jointed, the inner margin straight throughout, but the outer margin of the distal joint rounded. The distal margin is occupied by numerous short plumose spines. The palp is five-jointed, the proportionate length of the various joints being about 3. 3.5. 6. 5. 2. The entire organ is richly clothed with long setæ, more especially internally and distally. With a one-inch objective these are seen to bear a number of fine setæ about the middle of their length. The epignath is carried on a small plate, roughly ovate in shape, but having a flattened edge anteriorly. The epignath itself is a large plate ovoid though flattened on one side; it is just about as long as the masticatory lobe.

The whole of these mouth organs are richly pigmented with black arborescent chromatophores.

The first appendage of the mesosome is quite normal in general appearance, provided with long setæ on its ventral side from the distal extremity of the basis; the merus has both dorsal and ventral margins rounded, the former projecting forwards as a blunt point with a small tuft of setæ; the distal extremity of the carpus projects in a similar manner ventrally. The propodus is by far the largest joint, though not so broad as the merus; the dactylus, including the terminal claw, is about two-thirds the length; the claw has a very stout auxiliary. On the inner face of the propodus long setæ are arranged in eight or nine series; these and a very large proportion of those on or near the ventral margin are very finely toothed.

The three following appendages are provided throughout their length from the distal extremity of the basis with groups of very long and shorter simple setæ. The outer side of the basis carries a series of some half-dozen spines, and the ischium and merus have a dorsal and distal spine.

The three posterior pairs of appendages of the mesosome are strong, the proportions of the joints of the middle one are 5.5. 3.25. 2. 1.8. 5. 4. The basis bears several irregular but stout spinous processes along its dorsal border, the ventral border of the remaining joints, except the dactylus, are fringed with spines, these only develop as such along the ischium, dorsally there are a few scattered setæ of variable length. The dactylus has a few small setæ dorsally, but is otherwise smooth.

Five specimens of this species were taken in 300 fathoms off the Lee Barrier, Bottom Mud, lat. 78. 25. 40. S., long. 185. 39. 06. E. Four of these are females, one scarcely adult, two with ova, and one with numerous young not yet emerged from the brood pouch. In these young the various segments are rendered conspicuous by transverse ridges, but the only spinous armature visible on the entire body are the two posterior horns of the urosome; the cephalic horns are not present.

ANTARCTURUS FRANKLINI.

(Plate V., figs. 2 and 3.)

Arcturus franklini Hodgson (8), pp. 250-1.

Specific characters :—

A small spine at the antero-lateral angle of the cephalosome.

Two prominent dorso-lateral spines on each of the first three segments of the mesosome ; epimeral spines as well. No dorso-lateral spines in the male.

Urosome rounded, covered with small spines, with two slightly divergent terminal spurs.

The original description being quite unsatisfactory, and as I have now more material, I will take this opportunity to redescribe the species.

The body is usually covered with small, irregular chromatophores, which are most definitely arborescent on the cephalosome, which is smooth ; its anterior margin is incurved, and just behind the lateral angle is a stout spine. Two strongly developed and pointed horns lie behind the anterior margin and between the eyes.

The three anterior segments of the mesosome are almost smooth, the fourth being covered with small spines ; the first three carry a pair of very prominent spines dorso-laterally. The epimera of all four bear a stout spine, and there are also other smaller accessory ones, but these vary. The fourth segment is devoid of the prominent dorso-lateral spines. There is no great difference in the length of these segments, the first two are very nearly, if not quite, subequal, and the two following also, but these are a little longer. The three posterior segments are covered laterally with small spines, a band of them crosses each segment, forming a more or less prominent posterior fringe.

The metasome is also covered with small spines ; although all the segments are rigidly united, the two anterior ones are distinct, the third is fused with the urosome ; there are no conspicuous spines here other than the two prominent ones which terminate the body ; one pair, however, is a little larger than the remainder.

The first antenna is of the normal type ; the first joint is short and stout, with its inner margin considerably expanded as a wing-like enlargement, the second joint is but little shorter and spindle-like, the third is but the merest trifle shorter still, and the fourth is scarcely as long as the two preceding ones together, and has nine groups of sensory setæ.

The second antenna is longer than the body ; the first joint is very small and scarcely noticeable from the dorsum, the second is longer and its distal border forms two spikes, one each side. The proportions of the remaining joints and flagellum are as 5.5. 14.5. 19. 15. The third joint has four or more prominent spines near its outer border, the following joint also has a series, but they are smaller and diminish to nothing along the joint, which is also covered, but not very plentifully, with small

setæ, and these are plentifully distributed over the rest of the appendage. Nowhere are they conspicuous.

The first maxilla is a two-lobed structure, of which the inner is short, narrow and slightly curved; its inner margin is fringed with fine setæ, and the distal extremity is occupied by three stout, plumose setæ. The outer lobe is much larger and broader, its distal margin being fringed with about ten stout spines.

The second maxilla consists of a broad lobe rounded distally, the inner distal margin is armed with short and stout plumose setæ; towards the outer margin the setæ become longer, more delicate and much less plumose. Of the two external lobes the outer one is half the size of the inner and is armed distally with a few strong setæ, which are thinly plumose, those of the inner lobe are more numerous and intermediate in character.

The maxilliped presents quite a normal appearance. It rests on a broad plate which is nearly rectangular, but rounded on its outer side. The masticatory lobe is in two pieces; the proximal one being a little shorter than the distal, which has its outer margin rounded. Distally it is armed with short, stout, slightly curved setæ, which appear to be finely toothed rather than plumose. The palp does not present any special peculiarity; the first three joints progressively increase in length, the other two decrease; all are stoutly built and are provided in the usual way with long setæ. The epignath rests on a triangular plate of which the angles are rounded and the base is anterior; it is large and unequally oviform, the inner margin being nearly straight.

The first appendage of the mesosome, or gnathopod, does not differ essentially in its structure from that of the other species here described. The basis is stout, constricted near the base and rather irregular in outline; the three following joints are quite normal and plentifully provided with long, simple setæ. The propodus is supplied with long, simple setæ along its ventral margin, but on its inner face, that applied to the body, there are, towards the dorsal aspect, some half-dozen series of long setæ as well as others near the ventral margin, which are finely toothed rather than plumose. A rounded process on each side of the extremity of the propodus receives the dactylus. This is well provided with simple setæ, and the terminal claw is accompanied with an auxiliary more than half its size.

The three following pairs of appendages are fringed with long, simple setæ from the distal extremity of the basis. The first pair is the shortest, the other two subequal, the basal joint of the third being the largest and most spinous, but the three terminal joints are each rather smaller than on the preceding appendage. Externally the basis is provided with four stout spinous processes. The next joint has one very large one; the merus has two, a small proximal one and a large distal one; the carpus has but one of moderate size. The number of these spines only concerns this particular individual, they vary both in number and strength. The centre appendage has a length of 10 mm. on a body length of 20 mm.

The three posterior appendages of the mesosome are not very long, the proportions of the joints being 11. 6. 4. 4. 8. 7. The basis bears four or five stout spinous processes externally, the number and strength of these vary; the ischium only bears short setæ with which it is fairly well covered; the merus and two following joints bear along the ventral surface a series of stout spines, in addition to small setæ irregularly scattered. The dactylus is thinly covered with fine, small setæ and has a stout terminal claw and a small accessory.

A number of specimens of this species were taken in Winter Quarters inside the 25-fathom line, and one was taken in 125 fathoms. The average length of the body is 22 mm. Most of the specimens are females and, as one expects in members of this genus, the anterior part of the mesosome is considerably enlarged. Also the development of the spines is much increased, and those on the mesosome from which one of the specific characters are derived become comparatively enormous. There is also an indication of a stronger lateral spine on the third or fused segment of the metasome.

None of the females bear young, many of them have ova; these were captured in October and February. The males have the dorso-lateral spines very much less prominent, and the body is uniformly cylindrical throughout.

The oostegites of the females number four pairs, and the most posterior pair are supported by a stout spine from the epimeron of the fourth segment of the mesosome which almost reaches to the mid-ventral line, this also bears subsidiary spines.

The species was described from a single small though apparently fully developed female taken off Franklin Island by the 'Southern Cross' Expedition. With that individual were associated three very small and obviously immature specimens. Knowing that the spinous armature increases with age, and more especially so among the females, I declined to regard these as other than possible juveniles of this species.

This turns out to be correct, but the complete absence of large spines in the male led me to regard them as another species which was to have received the name of *A. australis*. It was not till I found that all my specimens of *A. franklini* were females and all those of *A. australis* were males that I discovered the error. It is absurd to suppose that during a residence of two years, and capturing these animals one or two at a time, only one sex of each of two species should be taken. The figures will show the differences between the two sexes, the most remarkable being the complete absence of the larger spines.

The foregoing description of *A. franklini* is based entirely on the females.

In the male the four anterior segments of the mesosome are practically smooth, though rather tuberculated laterally, the first of them bears an epimeral spine. They progressively increase in length, the fourth being half as long again as the first.

The segments of the metasome, though fused, are more distinct than in the female; two dorso-lateral spines, larger than the rest of those covering the urosome, are sometimes present.

The second antenna differs in the proportion of its principal joints and flagellum, being 3·7. 16·5. 21·5. and 16 as against 5·5. 14·5. 19. 15. of the female on which the detailed description is based. The first of these joints as measured, the third really, is devoid of spines.

About thirty specimens of both sexes were taken in Winter Quarters during the whole of our stay, all, but one, inside the 50-fathom line.

ANTARCTURUS HIEMALIS.

(Plate VI., fig. 1.)

Specific characters :—

Cephalosome and first four segments of the mesosome each with a pair of stout spines forming a single row on each side of the middle line.

Epimera with very prominent spines.

Mesosome rounded posteriorly and having a median keel terminating in a spine, the third abdominal segment, which is fused with the urosome, having laterally a very stout backwardly curved spine.

Long setæ predominate.

The entire body is marked all over with small arborescent chromatophores. The anterior border of the cephalosome is incurved, and close to this margin is a pair of very prominent horns curved forwards and outwards, these are provided with several very long setæ. Behind this is another pair, much smaller but still prominent, and these also have long setæ connected with them. Abreast of the interval between these two pair of horns lie the prominent and well-developed eyes.

The first four segments of the mesosome are subequal in length, and each is provided with a pair of very prominent spines placed one behind the other on each side of the mid-dorsal line; long setæ are associated with these. These segments are covered with minute spines, but outside the longitudinal rows they become much more prominent, and while varying in size, form a distinct fringe along the posterior border of each segment, the remainder of which is more or less coarsely tuberculated. The epimera bears one very pronounced spine and other smaller ones. The larger ones are setose.

The three posterior segments of the mesosome are minutely spinous, but as with the more anterior ones the spines are far better developed laterally and also form a strong postero-lateral fringe. The epimera are distinct from these segments and bear very prominent setose spines.

The metasome shows distinctly three segments and the urosome, all of which are fused. The first segment has a very large setose epimeral spine, the second has only a stout tubercle, while the third has an extremely stout backwardly curved spine, its base being as broad as the segment bearing it.

The urosome is rounded posteriorly, scabrous, and having a well-developed median keel which terminates in a spinous blade a little in front of the extremity. The borders are fringed with long setæ.

The first antenna (fig. 1a) conforms to the usual type, the first joint is broad, having a more definite wing-like expansion on its inner side than is usual, and on its outer border a strongly developed spine. The second joint is short, expanding distally. The third is much shorter still, these two together scarcely equal the first in length. The fourth joint is the longest and provided with a dozen tufts of specialised setæ. Every joint bears small arborescent chromatophores.

The second antenna is nearly half as long again as the body, and is fully clothed with long setæ. Of the five joints of the peduncle, the first is very short, the second is longer, and at its ventral extremity bears a very stout spine. The proportions of the four joints of the peduncle and the flagellum are approximately 3. 5.5. 11. 12. 13.5. The three terminal joints of the peduncle are plentifully provided with long setæ, and each joint of the flagellum bears a distal whorl of them as well as a few about the middle.

The first maxilla (fig. 1b) is stout, the smaller and inner lobe has a curved outline, the middle of its inner margin bears a group of long setæ, smaller setæ are plentiful distally, while the extremity is armed with three stout setose spines. The outer lobe, which is more than double the size, bears numerous chromatophores, compact at the base but becoming arborescent distally. The middle of both inner and outer margins is occupied by a group of short setæ, and the distal extremity is armed with eight or nine strong but simple spines.

The second maxilla (fig. 1c) is very broad, decorated as before with chromatophores, compact at the base and arborescent distally. The inner lobe is short and broad, its inner margin provided with fine setæ, distally it bears numerous spinous setæ, each provided with lateral setæ, but these are too short and stiff to justify the use of the word plumose. Of the two outer lobes, the outermost has been broken off in the specimen examined, the other is about one-third the diameter of the main lobe, and like it, it is provided with stout setæ furnished with small and stiff subsidiary ones.

The maxilliped (fig. 1d). The masticatory lobe is two-jointed, and in its entirety has something of an hour-glass shape, being constricted at the junction of the two joints; the distal margin and inner angle of the second joint is fringed with stout plumose setæ. The palp is five-jointed, stout throughout, none of the joints greatly exceeding the others in diameter; the first three joints progressively increase in length, the fourth is as long as the third but more slender, the terminal one is a stout knob. All are liberally provided with setæ on the inner margin, which increase in length to the fourth joint, and are more generally scattered over the first and second, the third and fourth having a distal fringe dorsally. The epignath is conical though not symmetrical, and the greater part of its margin is fringed with minute setæ. The entire appendage is covered with black chromatophores, only a few of which are arborescent; the majority are sharply-defined black spots, but many are irregular in shape.

The first appendage of the mesosome (fig. 1e) is prehensile. The basis is a long

joint approximately cylindrical and having a slight constriction near the proximal end, ventrally it bears a distal fringe of long setæ; the ischium is small and enlarged distally from a slender base; the merus is also short but very broad, almost circular though irregular in outline; the carpus is short, its ventral margin being nearly three times as great as the dorsal. These three joints are together about as long as the basis, and are plentifully supplied with long setæ on their ventral surfaces, and the two proximal ones have a few dorsally. The propodus is very nearly as long as the basis, its dorsal margin is straight with a few long setæ distally, ventrally it is swollen but not to any great extent and thickly fringed with long setæ, and a few are a little further back from the margin; on one side these are long, on the other they are short, and near the dorsal margin there is an irregular band of setæ of intermediate size. The dactylus is stout, but near its termination it becomes rather abruptly reduced in diameter and the claw is accompanied by a small accessory; the dorsal and external face of this joint is very richly supplied with long setæ.

The three following appendages of the mesosome are of the normal type and do not present any special features, they increase in size from the first to the third and the middle one, which may be taken as the type, has a length of 15 mm. compared to a body length of 27 mm.

The three posterior appendages of the mesosome are long. The proportions of the joints of the second are as 11. 7. 4. 4. 7. 5. The basis and the two following joints are covered with small tubercles and have a few straggling setæ, the inner margin of the carpus and propodus bears a row of slender spines, and at the end of the latter joint is a rounded lateral flange which supports the dactylus. This bears a very small accessory claw.

The uropoda are minutely tuberculated and fringed with long setæ. The marsupium of the female is composed of three pairs of plates, connected with the third to the fourth appendages of the mesosome.

This species was found in Winter Quarters at a depth of 125 fathoms. Only three adult specimens were taken; one of these is a female much larger than the specimen described. This specimen is abundantly overgrown with hydroids, polyzoa, worm tubes, etc., chiefly on the antennæ and anterior appendages; among all this were massed not less than sixty young. These are quite devoid of the spines so characteristic of the adult, and only two instead of the three posterior pairs of thoracic appendages are to be detected.

ANTARCTURUS MERIDIONALIS.

(Plate VI., fig. 2.)

Specific characters :—

Body slender, second antenna nearly twice the length of the animal, not conspicuously setose.

Cephalosome as well as body quite devoid of any spines except coarse epimeral tubercles on the first four free thoracic segments.

Urosome rounded posteriorly, with a median ridge ending in a spine a short distance from the posterior margin.

The anterior margin of the cephalon is arched forward on each side of the middle line so as to form a more angular cleft than the usual crescentic curve. There are no spines nor any trace of the cephalic horns. Eyes well developed and lateral as usual though not so prominent. Of the segments of the mesosome the first three vary but little, the fourth is about half as long again as the first. These anterior segments all possess a tubercle of varying size on the epimera, and the dorsum is irregularly corrugated.

The two anterior segments of the metasome are long and slender, the fusion of the third with the urosome is more complete than usual and marked laterally by a tubercular swelling of no great size.

The urosome forms the greater part of the metasome and is rounded at the extremity, marked in the middle line with a slender ridge which terminates before the extremity in a blade-like spine.

The first antenna is of the usual *Arcturus* type; the first joint is short but stout, having its outer margin expanded; the two following are subequal and shorter; the last is about five times the length of either of the two preceding, and provided throughout the greater part of its inner border with the normal sensory setæ.

The second antenna is long and slender, measuring some 57 mm.

The first joint is very small and quite inconspicuous; the second is longer, though short, the proportions of the remaining joints and flagellum are approximately as 2. 4. 12. 12. 21. All these joints are rather sparingly supplied with small inconspicuous setæ. The joints of the multi-articulate flagellum are long and slender, each bearing a few small setæ at the middle and distally.

As there is only a single specimen the mouth organs have not been dissected. The maxillipeds, however, as far as can be seen *in situ*, presents no special features; the epignath is about the average size and distinctly conical in shape. The appendage is rather handsomely marked with large arborescent chromatophores.

The first appendage of the mesosome differs but little from the usual type, and is handsomely marked with the same large arborescent chromatophores. The basis is long, furnished ventrally and distally with a fringe of long setæ; the isehium is about half the length; the merus is shorter and nearly round owing to its lateral extremity projecting forward as a blunt point; the carpus is rather cup-like with a larger ventral than dorsal surface; these three joints are well provided with long setæ ventrally. The propodus is large but not greatly expanded, it is liberally fringed with long setæ; the dactylus is stout, considerably increasing in stoutness from the base to near its distal extremity, when the dorsal surface becomes abruptly curved downwards to form a finger-like process, and this bears a stout claw and a smaller accessory; the dorsal surface of this joint is well provided with long setæ, more especially in the area of the "cushion."

The three following appendages are of the usual type; the joints are smooth without spines or tubercles, but the long setæ are simple and arranged in serial

groups. The dactylus, however, has its ventral margin furnished with small close set spines, and instead of the terminal claw there is a group of three large spines.

The three posterior pair of limbs are rather long, graduating in length from first to last; the last is smallest, the middle one is 13.5 mm. in length. The joints are not specialised, except that the carpus has a series of seven or eight stout curved spines on its ventral surface; the propodus is similarly provided, and the dactylus, which is slender, is as long as the propodus and bears a small claw with a smaller accessory.

The specimen is a male, and there is a long median process about 3 mm. long in front of the pleopoda; this is thin, but has a slightly irregular outline and the extremity is rounded; it is cleft for one-third of its length.

The first pair of pleopods have a protopodite about as long as the process above described, the exo- and endopodites are thin plates, subequal in size with truncated ends, and these are fringed with long setæ; the exopodite is much the strongest of the two. These have been examined *in situ*.

The single specimen is a male, and was taken in 300 fathoms off the Great Ice Barrier, Bottom Mud, January 27, 1902.

GLYPTONOTUS.

This genus was established by Eights about 1852 for a large species captured in the South Shetland Islands. It subsequently received other species, but these have, for some time past, been transferred to other genera, and the following species, first found on the French Antarctic Expedition, is the only other one that can be now assigned to it.

GLYPTONOTUS ACUTUS.

(Plate VII.)

Glyptonotus acutus Richardson (12), pp. 10-13.

Specific characters :—

Body more than twice as long as broad.

Sculpturing exactly as in *G. antarcticus*.

Urosome longer than broad, terminating in a prolonged spike.

Legs very long and slender.

Cephalosome is comparatively small, rounded posteriorly, being largely recessed into the first segment of the mesosome. The anterior margin is formed by two shallow crescentic depressions, above the origin of the antennæ these depressions are united in the middle line by a stout tubercle, and a smaller one occurs at the external border; from this the margin of the cephalosome slopes obliquely backwards to the posterior rounded margin in a slightly sinuous line.

The eyes are quite small, ovoid, and dorso-lateral in position; they lie on an oval swelling separated from the rest of the lateral plate by a shallow groove. The

surface of the cephalosome is sculptured in a peculiar way, but only differing in the minutest detail from that of the type species, *G. antarcticus*; two flattened patches occur behind the crescentic depressions of the anterior margin; immediately behind these is a transverse band more coarsely knobbed and posteriorly divided into four distinct tubercles, the outer ones being at least half as large again as the inner ones. This entire sculptured area is separated off from the "lateral plate," where the eyes are situated, by a conspicuous dermal fold, which reaches to about the centre of the level of the eyes.

The mesosome comprises the normal seven segments, and of these the fourth is the largest; the differences between any of them are, however, not great. All of them show a mid-dorsal longitudinal ridge more or less strongly developed. The sculpturing comprises a roughly triangular patch, its apex directed to the middle line. These patches are comparatively smooth on the third and fourth segments, but increase in roughness anteriorly as well as posteriorly.

The first segment arches forwards to partially enclose the cephalosome, a smooth dermal ridge runs round this segment and forms its anterior margin to a certain extent, but in front of it for a short distance either side the middle line is a thin band of irregular sculpturing. The three posterior segments are curved backwards, the curvature increasing progressively to the last which, with its epimera, completely hides the lateral margins of the two first segments of the metasome.

The epimera are large, smooth, the first three having their angles rounded; the posterior angle of the fourth is pointed. The epimera of three posterior segments are conspicuously separated from the segment bearing them; they become narrower, longer, and more acute from first to last.

In appearance the cephalosome and metasome are exactly like those of *G. antarcticus* Eights, the only difference being one of proportion.

The metasome comprises four free segments, visible dorsally, and a fifth, fused with the urosome, and this last is the longest; of the other four, the two middle ones are subequal in length, as are the first and fourth, which are a little shorter. The last segment of the mesosome conceals the lateral margins of the first, and its epimera hide, but not altogether, the diminutive epimera of the second segment; the epimera of the other two segments progressively increase, the last being large and directed backwards. The urosome has the fifth segment fused with it, and this irregularly tuberculated, and has a prominent mid-dorsal ridge; the urosome itself is long, comparatively slender, having a sinuous tapering margin and terminating in a strong and rather lengthy spine, the end of a well-developed median ridge.

Ventrally the fourth to sixth segments of the mesosome are conspicuously grooved in the middle line, and traces of such a character occur on all.

The oostegites are five pairs, and occur on the first segment to the fifth. In the largest female, which is the specimen examined in detail, they are not fully developed, and are strong ovoid structures which do not reach anywhere near the mid-ventral line.

A larger specimen, 119 mm. long, is a male, but this was dead when found, and, besides some injury, its inside had been almost completely eaten out. On the anterior border of the first segment of the metasome are a pair of penial filaments; these are cylindrical, about 5 mm. long, and terminate in an oblique orifice surrounded by a fringe of stiff setæ. A further sexual character is the long, slender, grooved filament connected, at its base only, with the endopodites of the second pair of pleopoda. It is half as long again as its endopodite.

The first antenna arise rather close to the middle line, and comprise a peduncle of three joints; the first two are subequal in length, and the third is nearly as long as the first two together. The first is slightly contracted in the middle, and has a group of stout setæ at its inner distal extremity; the second has a small group about the middle of its ventral border, as well as a distal fringe, which is, however, irregular, being most accentuated ventrally. The third joint is more slender, swollen, and setose distally. The flagellum is not as long as the third joint of the peduncle; it consists of a single joint, strongly curved near the proximal end, and has a band of fine setæ running along its outer border.

The second antenna arises immediately outside the first; the peduncle is five-jointed. The first joint is extremely short, the next two are subequal in size, the second having a strongly developed distal fringe ventrolaterally, and the third has a ventral mass of setæ rather than a fringe; the fourth joint is a little longer than the preceding, and, like it, widens distally; it has a well-developed dorsal distal fringe and a mass ventrally which is separable into two groups; the fifth joint is nearly as long as the third and fourth together; it carries along the distal half of the ventral margin four groups of setæ, besides a dorsal and ventral distal fringe. The flagellum is multi-articulate, and half as long again as the peduncle.

The buccal mass is very prominent; the supporting plate in front bears three tubercles, of which the median is very prominent. The epistome is an irregularly ovoid plate with a raised edge, and cleft in the middle.

The mandible is large and powerful, devoid of a palp; the cutting edge of that on the left side is strongly coloured, and overlaps that of the right.

The first pair of maxillæ (fig. 2) consist of the two normal lobes, the inner one considerably smaller and weaker than the other. The inner one terminates with three rather long and strong setæ and several others, much weaker; very minute setæ occur on both faces of the joint. The outer lobe, at least twice the length and breadth of the inner, has eight strong spines distally, and its outer border is fringed with minute setæ.

The second pair of maxillæ (fig. 3) are broad, if thin. The inner lobe is constricted about its middle, and then forms an ovoid enlargement. The inner and distal border of this is furnished with long slender setæ; the two outer lobes are very nearly equal in size; they are rounded distally and provided with long slender setæ; fine setæ occur on the outer border and the base of the external lobe.

The maxilliped (fig. 4) is large and strong. The basal joint is broad and stout, the

distal joint more than half the length, angular distally, and provided with a large number of thick setæ; the inner edge of this joint bears a group of fine setæ, of which two are larger and stronger than the rest, and both are thickened so as to form a broad wall rather than a narrow edge; this more particularly is the case with the basal joint. The palp is five-jointed and large; the first three joints progressively increase in length; the remainder decrease, but in no case is the difference great. Both the third and fourth are enormously expanded internally, each as a flattened plate with more or less rounded angles. The fifth joint is stout, but digitiform, almost surrounded with setæ, which increase in length to the distal extremity. The first joint only bears a few short setæ; the second, third, and fourth are richly setose internally, the third and fourth bearing short setæ externally as well. The epignath is a broad plate about the length of the basal joint.

The first three appendages of the mesosome are prehensile in function and exactly alike except in so far that they increase in size from the first to the third; the remaining four are ambulatory, exactly alike, and also increase in length from the fourth to the seventh.

The first appendage (Pl. VII., fig. 5) has a long basis, nearly as long as the four following joints, and carries a small tuft of spinous setæ ventrally at its distal extremity. The ischium is about half as long, and has two tufts of spinous setæ ventrally; it has a small external process which extends the articular surface. The merus is a very short joint with a large dorsal expansion which partially covers the succeeding joint and extends beyond the insertion of the propodus. This expansion terminates in a tuft of spinous setæ, and the ventral aspect of the joint, here very short, bears two groups of similar setæ on the inner side, and only one, which is smaller, on the other. The carpus is short and broadens dorsally, where it is very largely covered by the preceding joint; ventrally it carries three double series of stout setæ. The propodus is broad, rounded dorsally, nearly as long as the three preceding joints; the ventral margin appears as if serrated, and bears seven double groups of stiff setæ. A few short setæ occur dorsally at the distal extremity; the dactylus is slender, the point reaching as far as the carpus.

In the last appendage of the mesosome the proportions of the joints are 15. 9. 6. 12. 12. 6. The basis has the external articular process well developed, beyond which it is constricted; a flange runs along the ventral surface of this joint, to open out midway along it to form a protective shield for the base of the next joint. There is a small distal fringe dorsally. The ischium and succeeding joints are triangular in section, being flat ventrally. The dorsal ridge produced by this shape opens out on this joint to permit the more complete flexure of the succeeding joint and is armed with three groups of spinous setæ, five groups of such setæ occur ventrally. The merus has three and projects dorsally over the base of the carpus; the carpus has seven such groups and a distal fringe; the propodus has five, which more nearly approach transverse bands; there is also a short distal fringe dorsally. The propodus is long and slender.

The uropoda are large and opercular ; a prominent ridge runs round the structure on all sides except the distal extremity ; anteriorly and internally this ridge is some little distance from the edge and terminates in a point. The distal extremity is incurved and supports a pointed ovoid exopodite.

The endopodite is smaller, more regular in shape, and concealed by the exopodite.

The pleopoda are all very much alike ; the exopodite and endopodite are elongate lamellæ, the former a little the shorter ; both have setose margins. The sexual modification of the second pair in the male has already been alluded to.

Six specimens were taken at various times, in Winter Quarters, at depths varying from 20–125 fathoms. The largest of these was a dead male measuring 119 mm. in length and 42 mm. across the third segment of the mesosome. The smallest was not more than 13 mm. long. In the small specimen the mid-dorsal ridge is relatively more prominent, the metasome is proportionately longer, and the posterior band of sculpturing on the cephalosome is more strongly developed.

In life they are of a dull brown colour and of sluggish habits.

NOTASELLUS.

Instituted in 1886 by Dr. Pfeffer for a species taken in South Georgia, this genus now contains two species.

NOTASELLUS AUSTRALIS.

Notasellus australis Hodgson (8), pp. 251–3 ; Richardson (12), p. 13.

Specific characters :—

Uropoda bi-ramous, longer than the urosome, which is approximately as long as broad, and terminates in a small rounded lobe between them.

Two specimens of this species were taken at Cape Adare from the root of a large Laminarian, *Lessonia grandifolia*, in 17 fathoms, February 24th, 1904.

It has also been taken by the French Antarctic Expedition in the neighbourhood of Graham's Land, the western side.

AUSTRONANUS.

Body ovoid, without distinct waist between any of the segments.

Cephalosome large, with stout lateral projections bearing the small eyes.

Second antenna. Peduncle 5-jointed.

Mesosome. Segments very uniform in structure.

Metasome, a single joint—the urosome.

Pereiopoda, all ambulatory.

Uropoda, minute, preterminal,* a single setose joint.

This genus is quite distinct from any other hitherto recorded, superficially at least,

* Notwithstanding my protests the author insists on the use of this neologism.—ED.

it seems to resemble *Jæropsis* Koehler more closely than any other, though the structure of the second antenna and the uropoda should exclude it from the Janiridæ as at present defined.

AUSTRONANUS GLACIALIS.

(Plate VIII., fig. 3.)

Specific characters :—

Cephalosome broad, rather pointed anteriorly.

Second antenna, second joint produced externally as a flattened blade.

Urosome with ten recurved teeth in front of the preterminal uropoda.

This is the most diminutive species in the whole collection, and is of ovoid form.

The cephalosome is large, with the lateral projections which carry the eyes scarcely as broad as the first segment of the mesosome. The ocular projections are very stout though not very long, their angles are rounded, and the eyes, which are red in colour, are quite small. Anteriorly the cephalosome is arched forwards in rather a pointed manner, and its anterior border is flattened. In length it is equal to that of the first two segments of the mesosome.

Of the mesosome the first two segments are subequal in length, the first is curved forwards, the second is the widest, and, with the third, straight; the remainder progressively decrease in length and in width, all of them being more or less curved in a backward direction. The epimera, not separable from the body, are almost the full length of their respective segments, with rounded angles, and a distinct space between each segment; there is no "waist" between the fourth and fifth segments.

The metasome comprises only a single plate, the urosome. This is slightly wider than the last segment of the mesosome and attached to it along half its width. The external margins, as far as the insertion of the small uropoda, are rounded and armed with ten flat curved teeth, which increase in size as far as these appendages; between the uropoda there projects a rounded lobe.

The uropoda are short, single-jointed stumps, setose at the extremity.

The first antenna is short, and has a peduncle of two short joints and a flagellum of five.

The second antenna has a peduncle of five joints; of these the first is small, the second is large and much dilated externally, the third is short, the fourth twice as long, and the fifth rather more than the length of the two preceding. The flagellum only contains about seven joints, and is scarcely twice as long as the last joint of the peduncle.

The mouth organs cannot be detected without dissection, and this has not been done as there is but a single specimen.

The first of the pereopoda is stout and a little shorter than the others. The basis and ischium are two stout joints, the latter not so long as the former, but details cannot be seen without removal from the body. The merus is short and enlarged dorsally in a rounded manner, overreaching the base of the carpus. The carpus is

stout, with a flattened ventral edge armed with a couple of spines. The propodus is stout, nearly as long as the dactylus, with a somewhat flattened edge ventrally and armed with a spine. The dactylus is rather stout at the base, tapering and curved, with a spine or accessory claw about the middle of its length ventrally. The remaining pereopoda are much more slender, subequal in size, and comparatively small; the distal joints are cylindrical, and there is a stout curved seta on each dactylus.

Only a single specimen of this species was found among the dredge material in February, 1902, before the ship was frozen in to Winter Quarters, inside the 20-fathom line.

AUSTROFILIUS.

Cephalosome three lobed, the median one forming a broad rostral plate, the lateral ones flattened and bearing the small eyes.

First antenna small.

Second antenna, six-jointed peduncle, third joint with an external spine.

Mesosome having its segments variable, but not distinctly divided into two divisions.

Metasome forms a single plate with small preterminal biramous uropoda arising ventrally.

Pereopoda all ambulatory, of moderate length.

AUSTROFILIUS FURCATUS.

(Plate VIII., fig. 2.)

The cephalosome is not quite so broad as the first segment of the mesosome, and over all it is about as long as the first two segments. The anterior part is reduced to nearly half the diameter of the posterior, and tapering slightly it terminates in two stout but widely separated spines. The antennæ arise in the rounded depression on either side of this rostrum, if such it may be called. The eyes are small and dorso-lateral in position, borne on small rounded tubercles.

The form of the mesosome is not easy to describe; briefly, the six anterior segments are separated from one another by conspicuous bands of dermis softer than that which makes up the bulk of the segment. The first three progressively increase in width, though only slightly, the remainder decrease in a similar way.

The first segment is the longest, and is slightly curved forwards and of uniform length throughout. Referring only to the harder parts the second is little more than half the length in the mid-dorsal line, but increases laterally to be subequal in length; the third is intermediate in length, curved forwards laterally; the fourth is straight. The lateral margins of all these segments are more or less rounded and setose. The fifth segment is the shortest, widening laterally, and not setose; the sixth and seventh

progressively increase in length, the former having a sinuous posterior border and rounded lateral margins, setose as the more anterior ones, the latter is curved slightly backwards, the lateral margins curved and setose, and the posterior sinuous. Intervals of varying width exist between the segments.

The metasome consists of a single plate, the urosome, which is attached by about one-third of its width; it enlarges rapidly to its full width very little less than that of the preceding segment; it is broadly cordate in shape; the antero-lateral margins bear small setæ, and are in part very finely and sparsely serrate.

Three small teeth occur in front of the uropoda, which are of moderate size, ventral in origin, and preterminal in position. They comprise a single-jointed protopodite with a small single-jointed exopodite and endopodite. The former is about two-thirds the length of the latter and much more slender; each bears a tuft of long setæ and a few along both margins.

The first antenna consists of a peduncle of two joints, the first of which is stout, the second longer and more slender; the flagellum is small, little longer than the second joint of the peduncle.

The second antennæ are destroyed in the specimen figured, four joints of the peduncle remain; all are short, and the third of them carries externally a spinous appendage. In another smaller example the second antenna is complete and shows two more joints, long and stout, the distal one longer than the proximal and a little more slender; both are covered, but not thickly, with fine setæ. The multi-articulate flagellum is about as long as the terminal joint of the peduncle; it is well provided on the inner side with specialised setæ in small groups.

The mouth parts are quite normal as figured on Plate VIII.

Of the pereopoda the first is the shortest and a little the stoutest, the remainder are approximately subequal. They do not present any special features save that the terminal claw is well developed and accompanied by an accessory which is very nearly as large.

The pleopoda. The first pair are opercular.

Four specimens were obtained from the dredge material during February, 1902, taken inside the 20-fathom line. The largest is 3 mm. long.

COULMANNIA.

Cephalosome narrower than any segment of the mesosome except the last; the eyes are small and borne on elongated lateral peduncles.

Second antenna with a six-jointed peduncle, no accessory appendage on the third joint.

Mesosome without any conspicuous division between anterior and posterior portions.

Epimera not distinct from mesosome, prolonged and deeply cleft. Segments spinose in mid-dorsal line.

Metasome with one distinct segment spinose and a bulbous urosome with minute preterminal uropoda.

Pereiopoda ambulatory, except the first, which is prehensile.

Pleopoda, first pair forming an opereulum over the remainder.

This genus is established for two closely allied species which cannot be located in any existing genera. It is unquestionably a member of the family Janiridae and its nearest relations would appear to be the genera *Iolanthe* Beddard, and *Iolella* Richardson.

COULMANNIA AUSTRALIS.

(Plate IX., fig. 2.)

Specific characters :—

First segment of mesosome with epimera cleft to form two blade-like processes.

Urosome pointed.

The body is 5 mm. long, vaulted with the elongated, though not separable, epimera of the mesosome divided by a deep and wide cleft so as to produce them as narrow blades. Each of these segments as well as the first of the metasome bears a slight ridge produced in the mid-dorsal line into a stout backwardly curved spine. The entire body is covered, but not thickly, with fine setæ.

The cephalosome is a little longer than the first segment of the mesosome, rounded in front and having, near the posterolateral angle, a slender finger-like process which carries a small eye. The posterior margin is very nearly straight.

The first four segments of the mesosome are subequal in length, the third is the widest, and the epimeral blades of this and the succeeding are subequal in size, those of the first two segments graduate from the first to the fourth. The mid-dorsal spines are well in front of the posterior border of their respective segments. The last three segments are more or less curved backwards, particularly the last, though in the last segment it would be more correct to say angulated. Their dorsal spines are on the posterior border of their segments. The first and only distinct segment of the metasome is quite small and wedged in the curvature of the preceding one. Its mid-dorsal spine, though not so large, is quite as prominent as any of the others. The urosome is smooth, finely setose and peg-top shaped.

The uropoda are quite small, single jointed finger-like processes with a few distal setæ. They lie at five-eighths of the length of the urosome.

The first antenna arises just in front of the eyestalk. The peduncle consists of two small joints, and seen from the dorsum these are subequal in length, though the first is very much stouter than the second. The multi-articulate flagellum is twice the length of the peduncle, and is composed of joints of very variable length and almost devoid of setæ.

The second antenna is longer, and has a peduncle of six joints. The first two are extremely short; the third is longer than the two first together, swollen externally and setose; the fourth is short, forming a sort of elbow in the appendage; the other two

are comparatively long, subequal, and provided with scattered setæ. The multi-articulate flagellum is scarcely as long as the peduncle.

The maxilliped (fig. 2a) has a comparatively stout basal joint and a distal masticatory lobe about three-quarters of its length. The entire inner margin is straight, and not far from the base of the masticatory lobe are two papilliform teeth separated by a distinct interval. The distal extremity of this lobe is straight and its outer margin rounded. At the extremity and below the edge are three broad, denticulate spines. Three more, situated externally, are apparently simple; but this is due to their being seen sideways. The palp is five-jointed. The first three progressively increase in breadth, the first being very short, and the next two subequal in length, both these are setose on their inner margins, and the larger ones on their distal external borders also. The two terminal joints are comparatively slender, subequal in length and setose distally. The epignath is large, conical. A small rounded base, bulging considerably to terminate as a cone, it reaches nearly to the end of the masticatory lobe.

The pereopods are not of any great length, and are very much alike throughout. The first pair only is modified to any extent. This is short, the basis is the longest joint. The ischium is about half the size. The merus is shorter still, but dorsally it is carried as a spine over the carpus for fully half its length, the carpus itself being rather swollen ventrally and proximally, having two or three stout spines about its centre. The propodus is stout and but little shorter, and also carries a few spines ventrally. The terminal claw is stout, the "nail" is distinct, and has a small accessory. The remaining pereopoda are very much the same, only longer and much more slender. This involves an increase in the length of some of the joints, and the carpus and propodus are the most affected. In the two posterior pairs the merus forms a pronounced dorsal lobe over the base of the carpus.

The first pair of pleopods forms a stout operculum over the remainder, and together form a rather narrow band, which widens out about two-thirds of its length, from thence it tapers to a blunt point; the margins are setose.

As only a single individual of this species was taken, I have been unable to go into any very great detail. The maxilliped of one side has been removed for examination, but that is all.

Coulman Island. 100 fathoms. Stony ground. February 13, 1902.

COULMANNIA FRIGIDA.

Specific characters:—

First segment of the mesosome with only one epimeral blade.

Urosome prolonged as a distinct spine.

During the progress of this Report an Isopod was sent me from the British Museum which had been found clinging to the body of *Colossendeis frigida*. This specimen I at first thought to be identical with the preceding, but a very brief examination shows that it is quite distinct.

In general appearance this species greatly resembles the last, but it is instantly recognised by the fact that the first segment of the mesosome has its epimera produced into a single narrow blade only.

The cephalosome is rounded, narrower than in the Coulman Island species, which is figured on Plate IX., and the ocular peduncles are shorter and stouter. They do not reach to anything like the distance of the epimera of the first segment of the mesosome.

The mesosome is more distinctly setose than in the last species. The dorsal ridges, with their median spines, are more strongly developed. The urosome is, in its distal portion, prolonged into a definite terminal spine, and is densely setose. Both pair of antennæ appear to be very similar to those of the preceding species.

The pereiopoda are similar. The first pair are short and stout, prehensile in function, the basis is rather long, the ischium not half the length, and the merus shorter than that. This joint is expanded dorsally over the base of the carpus, and carries several stout setæ. The carpus is a stout joint, swollen ventrally and armed with setæ and two or three spines. The propodus is scarcely as long, stout and setose ventrally. The dactylus has a stout base, a comparatively slender claw, with an accessory spine and two curved setæ.

The remaining pereiopoda are distinctly ambulatory in function and have the normal cylindrical joints, excepting only the merus, which preserves its peculiar character and carries a spine dorsally. The carpus is stout and slightly swollen dorsally, with one or two spines and a few setæ ventrally, and the propodus is longer, more slender and slightly curved, with a few setæ ventrally. The dactylus retains its accessory spine and two curved setæ throughout.

There is but a single specimen of this species, taken at Winter Quarters in 125 fathoms.

NOTOXENUS.

Body much vaulted anteriorly, widening conspicuously to the third segment of the mesosome.

Cephalosome rounded, smooth, with long and slender ocular peduncles. Eyes very small.

Antennæ. Second pair with a peduncle of six joints, no accessory appendage.

Mesosome. First four segments straight or very nearly so, three posterior segments recurved. No special interval between any of them. A mid-dorsal spine on each.

Metasome. One very small segment and a large urosome with diminutive pre-terminal uropoda.

Pereiopoda. The first prehensile, the remainder ambulatory, not unduly long.

This genus is closely allied to *Coulmannia* of this Report, in fact I have long hesitated about separating them, but the bodily form which should be of greater importance than variation among the appendages, I think, quite justifies the course adopted.

NOTOXENUS SPINIFER.

(Plate IX., fig. 3.)

Specific characters :—

Cephalosome rounded, with long ocular peduncles ending in four small knobs surrounding the eye.

Mesosome with mid-dorsal spine on each segment and also on first segment of metasome.

Lateral extremities of every segment very distinct from each other.

Urosome very nearly as long as six segments of the mesosome. Top-shaped, with diminutive preterminal uropoda.

The body forms a pointed oval and is much vaulted anteriorly or round-shouldered. The interval between the third and fourth segments of the mesosome is a variable feature, but in no case is it specially conspicuous.

The cephalosome is subcircular when seen from above, but at first sight it does not appear to be so owing to the foreshortening due to the curvature of the body. The eye-stalks arise laterally, they are slender and extremely long, nearly as long as the diameter of the cephalosome, and extend that structure beyond the first segment of the mesosome. They are slightly enlarged at the extremity, and the eye lies in the middle of four small, blunt lobes.

The mesosome comprises seven distinct segments, in the first of which the cephalosome is to some extent embedded. The next three segments are straight, the third of the entire series being the widest. The three posterior segments are curved backwards, their curvature increasing as their diameter decreases. All the segments are provided with a backwardly curved spine in the mid-dorsal line, their size is proportionate to the size of the segment, but their position varies, those of the last three being on the posterior-border of their respective segments. The epimera are inseparable from their respective segments; they are large and irregular in shape. Those of the first three segments are more or less directed forwards and to some extent rounded at the extremity, the fourth is more truncated, those of the last three are rounded.

The metasome consists of a single segment, wedged in the curvature of the last segment of the mesosome, and the urosome; the former carries a mid-dorsal spine. The urosome is pointed, peg-top-shaped, more than one-third the length of the entire animal, with small preterminal uropoda. Its entire margin is fringed with small, rather coarse setæ, and its surface is also well covered.

The uropoda are very small, single-jointed, with terminal setæ. The entire body is rather sparsely covered with small setæ; these are more abundant and conspicuous on the epimera.

The first antenna has a peduncle of two joints, the basal one being quite twice as long as the other, both are setose distally; the flagellum is about twice as long as the peduncle and has only four joints, the first being rather long.

The second antenna has a peduncle of six joints; of these the first two are very short, especially the second; the third is as long as the two together; the fourth is

about half the length of the third and forms a bend in the direction of the appendage. The two terminal ones are large and slender, the distal one being a little the longest. The peduncle bears numerous scattered setæ. The flagellum is scarcely as large as the two terminal joints of the peduncle.

The mandible is curved and rather tapering, it terminates in a cutting edge with two stout teeth, one of which, the lower one, is lobed; below these teeth are four or five spines which have their distal portions converted on one side into a thin finely serrated blade. The molar process which arises from the base of the organ, and is almost as large, is slightly constricted in the middle; the distal extremity is strong and has a curved process or tooth anteriorly. The palp is a comparatively delicate structure of three joints, the proximal two are subequal in length, the third is little more than half as long and terminates in a pectinate claw.

Both pair of maxillæ are quite normal.

The maxilliped (fig. 3a) is also normal in structure, the straight inner edge of the masticatory lobe bears two papilliform teeth, the distal extremity is straight and armed with setæ, three at least of these below the edge are broad and finely denticulate, exactly like the denticulate spines on the ovigers of so many Pycnogonids, the others are simple. The outer margin is rounded to some extent. The palp is five-jointed, the second joint being by a little the largest. The first three are broad and the two large ones have a few long setæ on their inner margin, and the other two joints are cylindrical with setæ distally. The epignath is large, rather more than three-quarters the length of the entire masticatory lobe, it is somewhat conical in shape, attached at the inner lower angle.

Pereiopoda. The first pair are short and stout, here the basis is long and cylindrical, the ischium is just half the length, the merus about half this, but enlarged dorso-ventrally and with setæ distally. The carpus is about half as long again as the merus, swollen ventrally and armed with three stout teeth and the stumps of one or two more. The propodus is rather short, stout and curved and bears several setæ, the stronger ones are ventral. The dactylus is long, slender, and has an accessory claw.

In the remaining pereiopoda the joints vary a little in their proportions, but there are no structural differences between them. All the joints are cylindrical except the merus, which is swollen dorsally. The carpus is elongated and armed ventrally with three or four spinous setæ. The propodus is curved slightly and carries a few strong setæ dorsally and ventrally, the strongest being ventral. The dactylus, long and slender, has a small if stout accessory claw, and between it and the terminal claw is a long seta.

The first pair of pleopoda form an operculum over the remainder in the female. The sympodite of the male is a narrow structure; the outer margin is curved gently outwards for about two-thirds of its length, it then tapers to a point. Against the exterior curvature is seen the ovate exopodite of the succeeding pair.

Several specimens were taken from sponge débris and other dredge material at intervals during our stay at Winter Quarters inside the 25-fathom line, 1902 and 1903.

HALIACRIS.

This genus was established by Dr. Pfeffer in 1886 for specimens obtained in South Georgia. It is very much open to question if it is distinct from *Munna*. I think not.

HALIACRIS ANTARCTICA.

Haliacris antarctica Pfeffer (11).

Haliacris australis Hodgson (8), pp. 253-4; Richardson (12), p. 16.

This species was very abundant in Winter Quarters, and was continually being taken in the dredge and D-net throughout our stay. As might be expected, the friction they enjoyed in either of these implements was such as to more or less completely dismember them. In consequence only a very few specimens were obtained in a sufficiently satisfactory condition to justify preservation. In the summer, however, we could manage better; the D-net was always kept on the sea bottom, and also always hauled to the surface before use to be certain that it was properly "set." Although the temperature was below freezing point, the weather was generally bright and warm, and these animals were often found wandering over the net or its frame. It was therefore a comparatively simple matter to pick them off and place them in a special pot, so that the majority arrived at the ship in a satisfactory condition. From the material thus obtained I have been able to examine this species in greater detail than hitherto. The description in the 'Southern Cross' Report is little more than worthless. There cannot be any doubt that the species there described is identical with that of Dr. Pfeffer taken in South Georgia. The 'Discovery' specimens also belong to the same species, and it is now seen that there is a sexual dimorphism, the old males modifying the shape of the urosome to a considerable extent. That this is due to age is certain, none of the smaller specimens have a urosome of such a shape, it is only found in the old males, some of which attain a length of seven millimetres. In these the posterior pereopoda are of extreme tenuity. In life these animals are slow of habit; they crawl about with the metasome directed upwards, which seems to be its normal position. In colour they are a mottled-brown.

Cephalosome broad, as long as the first two segments of the mesosome, considerably reduced anteriorly to form a broad rostral plate; on each side of this is a curved recess terminating externally in a curved spine in front of the eyes. The eyes are comparatively large, on lateral processes which are slightly constricted at the base. The posterior margin of the cephalosome is rounded, and the rostrum fringed with small setæ.

Mesosome. Four anterior segments differing very little in breadth, first and

fourth shortest, subequal in length; the second and third also subequal, but little longer. All straight, the first partially enclosing the cephalosome. The three posterior segments subequal in length, increasing in curvature and decreasing in breadth to the last. Lateral margins of all the segments more or less truncated, the first three obliquely so, and all with distinct epimera, triangular in shape.

Metasome, a single small segment wedged in the curvature of the preceding segment, and a urosome, large vaulted, fringed, but not thickly with spinous setæ, and which form two small groups distally. Ventrally it forms a pocket for the pleopoda. In shape the urosome varies largely, in the smaller specimens it is ovoid with a slight depression for the reception of the diminutive uropoda. In the old adult males it becomes globular, with a truncated projection distally armed with two small groups of spines.

The males resemble the females, except that the latter are very much broader and the mesosome ovoid.

First antenna, the short peduncle is two-jointed. The first joint is short and stout, the second is slender and a little longer; the multi-articulate flagellum is about half as long again as the peduncle.

Second antenna, very long, peduncle six-jointed. The first three joints are very short, the second being as long as the other two together, and constricted in the middle; the other three joints are long, the fourth is long, the fifth much shorter and armed distally with a spine; the sixth is simply enormous, longer than the two preceding together. It is very slender, and provided with setæ throughout. The multi-articulate flagellum is longer than this joint.

Mandible. Strong, curved, cutting edge with two long teeth anteriorly, a third with which is associated a group of spinous setæ. Molar tubercle very prominent, its edge produced to a fine point posteriorly. Palp three-jointed, second joint a little the longest, the other two subequal; the second joint has two, and the terminal one three or four stout setæ armed with very fine closely set teeth.

First maxilla. Normal, the inner lobe terminates in three spinous setæ and a smaller one; these are coarsely plumose, at least on one side. External to these is a group of finer setæ. The outer lobe has about ten stout pectinate spines distally, another row of them internally, a short distance below. A group of much finer ones occurs on the inner edge of the joint.

Second maxilla. Normal, a rather broad blade reduced to about half its diameter in the distal half. This portion forms a blade, the inner and distal margin of which is thickly covered with stiff setæ. The external joint is bifurcated, the inner part being the stouter, both terminate with four long setæ.

Maxilliped. A short basal joint, the masticatory lobe is two-jointed, subequal in length. The distal joint is rounded externally and armed at its extremity and internally with coarsely plumose setæ. The inner margin carries four papilliform teeth about the middle of its length. The palp is five-jointed, the first short, the

second the longest, this and the next are considerably expanded internally and provided with long setæ distally, the dorsal aspect carries a few short ones; the two terminal joints are cylindrical, rather slender and setose in the same manner as the second and third.

Pereiopoda. The first pair show a considerable sexual difference. In the male the limb is conspicuously clavate; the basis is long and slender, the ischium about half as long. The merus is shorter still, considerably expanded distally so as to become vase-shaped, with numerous fine setæ dorsally. The carpus is large and very stout, expanding distally and prolonged in its inner margin to an extent nearly equalling the length of the propodus; it is setose along its ventral margin, and distally where there are also two or three spines. The propodus is also a broad joint very much shorter than the carpus, it is expanded distally to form a sort of blunt spur ventrally, and this margin is covered with long slender setæ. The dactylus is articulated at the outer extremity of the propodus, is very stout and overlaps the carpal process by at least half its length, it terminates in a strong claw and a well-developed auxiliary; the ventral margin is fringed with long slender setæ. This limb is quite different in the female, the merus is but little expanded and does not differ otherwise from any ordinary joint; the carpus is a little longer, expanding distally with its ventral margin, forming a flattened blade which projects beyond the termination of the "shaft"; this blade is armed throughout with strong spines, longest and strongest distally; the propodus is stout, nearly as long as the two preceding joints together, with its inner margin rather swollen, and provided with three spines and several series of very fine stiff setæ, forming comb-like structures. The dactylus is long and slender, but does not reach the carpal process, it terminates in a long claw, with an auxiliary about one-third the size, the ventral margin of the joint is fringed with very small stiff setæ.

The remainder of these appendages differ but little in structure though a good deal in size; they are alike in both sexes and all are very slender. In the second appendage, the ischium is very little shorter than the basis, and carries a stiff seta; the merus is elongate, dilated dorsally, and also carries a stiff seta; the carpus is long, cylindrical, and provided with several setæ; the propodus is very much longer, armed along its ventral margin with spines; the dactylus is the shortest joint of the appendage armed with two claws and a seta between them. The three following pairs increase a little in length, but the posterior pair do so considerably. The basis is armed distally with a stout spur, the ischium is considerably longer; bent at a right angle, near its middle, the bend is distinctly shown in the structure of the joint, but it does not appear to be an articulation. All the other joints, except the dactylus, are lengthened, but their spinous armature is not strengthened.

The pleopoda, female. The first pair form a single opercular plate, which is broadly ovate and attached by a broad base; it is sparsely surrounded with short setæ, and the extremity is slightly irregular. The third pair is of more complex structure, the

endopodite has a rather broad peduncular joint, followed by a second nearly twice as long, its inner margin is nearly straight, its outer margin makes a bold curve outwards, sweeping round to the irregularly truncated extremity, which is armed with three large plumose setæ. The exopodite as a whole is falciform, it is composed of two joints, the basal one having an oblique extremity is very nearly as long as the entire endopodite; the second joint bears a conspicuous mid-rib, also seen distally on the other, and tapers gracefully to a point; a few small setæ occur externally.

The fourth pair has a small conical basal joint. The endopodite is long, curved and setose internally; it is composed of two joints, the distal one being about two-thirds the length of the other, it is armed distally with two blunt setæ or rather spines. The exopodite is scarcely as long as the endopodite, it is spoon-like, and the inner margin is sinuous, the outer boldly curved, then tapering to a blunt point. The remainder are similar, but the exopodite becomes more concave or spoon-like.

First pleopod of male. The sympodites are long narrow structures fused in the middle line. The external margins are curved inwards, dilating distally where they are deeply excavated and also appear to be tubular. This recess is occupied by a second joint, a thin ramus, the margin of which is ciliate. About three-fifths of the length of the sympodites there projects laterally an expansion from below.

The second pair is not quite so long, the inner edge of each is straight, the outer edge rounded, the structure being about four times as long as broad. The outer border is very finely ciliate and fringed with small setæ at intervals within the edge. This sympodite is marked with two strong muscle bands, the inner one bends abruptly inwards, connected with a stout irregular structure which passes forwards, projecting from the sympodite to bend again backwards as a large pointed blade. This is the exopodite. The other, the endopodite, forms a lobe rounded posteriorly, and has what appears to be a tubular mouth. The remainder are as in the female.

AUSTROMUNNA.

Austrimunna Richardson (12), p. 19.

This genus was instituted by Miss Richardson for a small Isopod found off Wieneke Island by the French Antarctic Expedition. The following is the second species assigned to the genus.

AUSTROMUNNA ROSTRATA.

(Plate X., fig. 3.)

Specific characters:—

Body ovoid.

Cephalosome small, with a short rounded rostrum, and with eyes on elongated peduncles.

Mesosome. Four anterior segments not widely separated from the three posterior, the three anterior segments with large truncated epimera.

Urosome broader than long with minute dorso-lateral uropoda.

The body is compact, ovoid in shape.

The cephalosome is of moderate size, exclusive of the eye-stalks. It is about one-third the greatest diameter of the mesosome; it is rounded anteriorly with a short stump-like rostrum in the middle line. The eye-stalks arise from the postero-lateral angles, but they can be hardly called slender, they extend to the margin of the epimera of the first segment of the mesosome. The eyes are not very strongly developed.

Of the mesosome the first four segments are separated by a distinct but short "waist" from the three posterior pair, this is more prominent in the female than in the male; the female also is proportionately broader.

The first segment is curved slightly to receive the cephalosome, and the broad truncated epimera are directed forwards, the three succeeding segments are subequal in length. The second has the anterior margin of its epimera extended forwards, on the third they are not so extended, and on the fourth they are smaller and rounded. The three posterior segments are much shorter, subequal in length and increase in curvature as they are reduced in diameter. Of these the epimera of the first are narrow and rounded, of the second they are enlarged and then form a blunt point, of the third they are more blade-like; the posterior margin is straight, the anterior being curved.

The metasome comprises one short narrow segment wedged in the curvature of the last of the mesosome and a urosome which is broader than it is long, rounded to the insertion of the uropoda, and to that point its margin is minutely dentate; beyond these it terminates in a blunt point.

The uropoda are very minute, dorso-lateral in position and comprise a small endopodite. The exopodite is extremely minute and can only be seen with difficulty. Both branches terminate with a few small setæ.

The body is entirely covered with very small setæ.

The first antenna consists of a two-jointed peduncle, the first joint being comparatively large and stout; the second is not more than half the length and much more slender. The flagellum is short, four joints only, of which the terminal one is the longest.

The second antenna has a peduncle of six joints, the first two are very small, the third is large, swollen externally; the fourth is very small and only forms a bend in the appendage; the fifth is smaller than the sixth, and the sixth is twice as small as the preceding. The flagellum is scarcely as long as the last two joints of the peduncle.

The mouth parts are normal.

The mandible has the cutting edge widely separated from the molar process, the latter is curved, tapering, and ends in three spinous teeth and four more slender spines below these; near the base of this process arises the three jointed palp. The cutting edge is an elongated process widening distally to a straight edge which bears one prominent tooth anteriorly.

The maxillæ hardly present any distinctive features.

The maxilliped is normal in character, it is short and thickened towards its straight inner border, and on this are two papilliform teeth; distally it carries a few spines. The palp is five-jointed, the first three progressively increase in length, the others decrease; the three distal bear rather long setæ internally.

The pereopoda are not long, the first is short and stout, adapted as a prehensile organ. The basis is the longest joint, the ischium is about two-thirds its length and enlarged on its inner margin. The merus is half the length of the ischium and much enlarged dorsally and carries two setæ; the carpus is a large joint, slightly swollen ventrally and provided with spines and setæ; the propodus is shorter, stout and setose ventrally; the dactylus shorter still, with a strong accessory to the terminal claw and a curved seta near its extremity.

The remainder are distinctly ambulatory in function and are much more slender, every joint with the exception of the merus being approximately cylindrical; the merus is but slightly enlarged distally. There are but few small setæ scattered on these appendages, which slightly increase in size from the first pair to the last.

The first pair of pleopods act as an operculum to the remainder.

A number of specimens were taken from dredge material inside the 25-fathom line. A few individuals at a time were found during the whole of our stay.

ANTIAS.

Richardson (12), pp. 16-17.

This genus is another of those instituted by Miss Richardson for the Isopods brought back from the Antarctic by the French Expedition under Dr. Charcot. The species described below is identical with that found on the western side of Graham's Land and was abundant in our Winter Quarters.

ANTIAS CHARCOTI.

(Plate IX., fig. 1.)

Antias charcoti Richardson (12), pp. 17-19.

Specific characters :—

Cephalosome with a broad rostrum divided into two rounded setose lobes. A curved spur in front of ocular peduncle.

Both meso- and metasome fringed with long spinous setæ. A transverse row of fine setæ on four segments of the mesosome.

Uropoda large, biramous. Exopodite straight, endopodite curved.

The cephalosome is broad, but even including the ocular peduncles it is not quite so wide as the first segment of the mesosome. The anterior part is produced into two stout rounded tubercles, forming a broad and bifid rostrum, each part being well

provided with a number of stiff setæ. The eye-stalks are rather stout and in front of them; on the margin of the cephalosome is a stout slightly curved spur.

The surface of the cephalosome is sparingly covered with rather long setæ.

Of the mesosome the first segment is stout, the two following are subequal, but the third is the broadest, the fourth is a very little shorter and narrower than the preceding. All these have rounded epimera; they are rather widely separated and in the first segment they are directed forwards so as to partially embrace the cephalosome. All are provided with long spinous setæ, and the segments themselves are furnished with a transverse band of more delicate setæ.

The three posterior segments are curved posteriorly, their curvature increasing as their diameter decreases. The first of these segments carries a transverse row of setæ, the other two bear two or three stouter ones more laterally.

The metasome consists only of a single pentagonal plate, the angles of which are, however, rounded, and each of the three free ones bears a group of stout spinous setæ similar to those on the epimera of the rest of the body. There are a few setæ on the surface of this plate, centrally and anteriorly.

The uropoda are very large and biramous. The protopodite is a single joint with a comparatively slender base and widening distally, the exo- and endopodite differ but little in size, the former is straight and provided on both sides with long stiff setæ; the latter is curved and only carries the setæ on the outer side of the curve and distally.

The first antenna is short, it comprises a peduncle of two joints subequal in length, but the proximal one is much shorter than the other, and fringed distally with stout spinous setæ. The flagellum is about half as long again as the peduncle and consists of only four joints, the first two are short, the others are more than twice as long, the last being very slender and provided with two specialised setæ.

The second antenna has a peduncle of five joints; of these the first three are very short and stout, the basal one having a long spine on its inner border and the third forms a characteristic bend in the appendage. The two terminal ones are long and slender, the advantage being with the more distal one; the flagellum is about as long as these two joints.

The mouth parts are normal.

The mandible is strong and the masticatory lobe terminates in four bilobed teeth, or, rather, two pairs, since one pair is larger than the other, the individuals of each pair being approximately subequal; below these are three slender teeth, having their upper margins produced into a serrated blade. The molar process is long and widens out distally into a plate-like structure, having anteriorly one prominent tooth and posteriorly several small tubercles. The palp is three-jointed, the first two joints are rather long, fringed on one side with very minute setæ; the third is a serrated spine less than half the length of the joint bearing it.

The first maxilla comprises a short and slender inner lobe armed distally with

four specialised setæ of varying length and bearing extremely delicate subsidiary setæ; the outer lobe, twice the size, is armed with several stout spinous setæ, each having a serrated inner margin.

The second maxilla consists of a comparatively large inner lobe, the inner margin of this is rounded distally and bears several slender spinose setæ, two of which, the innermost, are the longest and dentate; of the two outer lobes the innermost bears three slender, tapering and minutely serrated setæ, the other bears four.

The maxillipeds show a broad masticatory lobe upon a short basal joint of quite normal structure, the inner straight margin carries two papilliform teeth and distally there are a few dentate setæ; these are very minute. The palp is five-jointed, all the joints are slender and comparatively long. The epignath is long, rather spindle-shaped, most swollen on the outer side, and it terminates in a blunt point almost abreast of the distal border of the masticatory lobe.

The pereiopoda are short.

In the first the basis is a little longer than the ischium, both are slightly curved and quite smooth; the merus is short, expanded dorsally and carries a few stout setæ distally; the carpus is a little shorter with a stout spine ventrally; the propodus is rather longer with two such spines ventrally and a few delicate setæ distally; the propodus is stout with a strong claw and an equally strong though much shorter accessory with a fine seta between the two.

The second pereiopod differs in that the carpus is quite as stout as, but longer than, the merus; this latter bears one stout spine dorsally and a few fine setæ ventrally, the carpus bears several scattered setæ, strongest dorsally.

The third and fourth do not differ essentially; the fifth is rather longer, and the carpus bears four short and stout spinous setæ ventrally and three long ones dorsally, the two following are a little shorter and less conspicuously spinous. The brood pouch is formed by broad lamellæ on the second to the fourth appendages.

A large number of specimens of this species were taken during our stay in Winter Quarters; they were almost entirely picked out of the sponge debris.

Inside the 25-fathom line.

AUSTROSIGNUM.

Cephalosome sub-rotund, much narrower than the first segment of the mesosome.

Eyes small, on long slender peduncles.

Antennæ of moderate dimensions, peduncle of the second six-jointed, without an accessory appendage.

Mesosome, the three posterior segments distinctly separated from the four anterior, recurved and diminishing in size.

Metasome comprises a single independent segment and bulbous urosome often prolonged as a spinous process with minute preterminal uropoda.

Pereiopoda ambulatory except the first, which is prehensile.

Pleopoda, the first pair forms an operculum over the remainder.

This genus is a member of the family Munnidæ and probably more nearly related to *Pleurogonium* than to *Munna*.

AUSTROSIGNUM GRANDE.

(Plate X., fig. 1.)

Specific characters :—

Head small, rounded, with eyes on long slender stalks.

First segment of the mesosome much the longest, and all segments widely separated laterally ; a distinct waist between the fourth and fifth segments.

Urosome pointed.

The cephalosome is small, rounded in front ; it rests in a crescentic depression of the first segment of the mesosome which arches forwards on either side to receive it and is more than twice its diameter.

The eye scarcely appears to be well developed ; it lies at the extremity of a long, slender peduncle which arises from the postero-lateral angle of the cephalosome. The peduncles very nearly attain the width of the first segment of the mesosome.

The first segment of the mesosome is nearly twice as long as the succeeding one but of smaller diameter, the second to the fourth are subequal in length, but the third is the widest by the merest trifle. There is a distinct waist between the fourth and fifth segments ; the three posterior ones are subequal in length, decreasing progressively in width and increasing in curvature. The epimera are rounded, in the first segment unevenly so, and all are widely separated from each other, elongated, and not distinct from their respective segments.

The metasome comprises one very small segment wedged in the curvature of the preceding one, and a urosome which is ovoid in shape but having a slightly truncated extremity.

The uropoda are very small ; they are situated at some little distance from the extremity, and comprise a comparatively stout pointed joint or propodite, and articulated to it at about half their own length from the extremity are two minute joints.

The first antenna comprises a two-jointed peduncle, both joints are comparatively long, the second being the longer ; the flagellum is about as long as the peduncle.

The second antenna comprises a six-jointed peduncle, the first two joints of which are short and stout ; the third is very nearly twice as long and more slender ; the fourth is shorter than the preceding, curved to form the bend in the appendage, the other two are slender and as 2 to 2·5 in length ; a few setæ are scattered throughout the peduncle. The flagellum is scarcely as long as the last joint of the peduncle.

The mouth parts are normal.

The mandible is stout, the cutting edge is prominent, expanding to its distal extremity which bears a very small tooth both anteriorly and posteriorly, the intermediate margin being minutely toothed. The molar process is stout, curved and tapering, it ends in two or three stout teeth and four slender spines below these.

The palp was not observed.

The first maxilla consists of the normal two lobes, the inner and smaller carries distally two large and one small seta, which are slightly plumose, the outer lobe is armed with stout spines.

The second maxilla. The principal lobe is nearly as broad as the other two together and is armed with stout pectinate spines, the innermost ones being the shortest and strongest. The other lobes are subequal in size, and each bears two long pectinate spines, which are much more delicate than those on the inner lobe.

The maxillipeds are of quite normal proportions; the distal margin of the masticatory lobe is armed with three or four denticulate spines. There are two papilliform teeth on the inner margin, these are rounded knobs with short stalks. The palp is five-jointed, the first three are broad and progressively increase in length, the remaining two become more finger-like.

The pereopoda are, except the first, uniform in structure, slender and not inordinately long, as far as can be seen without removing a limb. The first pereopod is rather short and much stouter than the others, obviously prehensile in function. The basis is stout and of moderate length, the ischium rather more than half as long. The merus and carpus are both very short and stout, the latter is much dilated, with two stout spines ventrally. The propodus is slightly curved and about as long as the two preceding joints. The dactylus is well developed, with a spine or accessory claw at the base of the nail and two curved setæ upon it.

Of the others the basis is rather long, the ischium much shorter. The merus is short and enlarged dorsally; the carpus is quite twice as long; the propodus a little longer and much more slender than the carpus; the dactylus is well developed, proportionally one-third the length of the propodus, and a "nail" is distinct with a small spine or spinous seta at its base.

The first pair of pleopoda which forms an operculum over the remainder consists of a comparatively narrow band which at about two-thirds of its length widens out considerably and then tapers to a blunt point. The lateral projection bears three small setæ, and the angular apex is due to the folding of the lateral margins inwards and downwards.

Four specimens were taken in Winter Quarters during February and March, 1902, before the ship froze in. Inside the 20-fathom line.

AUSTROSIGNUM GLACIALE.

(Plate X., fig. 2.)

Specific characters :—

Head small, rounded ; eyes not well developed, at the extremity of slender peduncles.

First four segments of the mesosome subequal in length, and separated from the posterior three by a distinct "waist" ; the posterior three diminishing in diameter, and but slightly curved.

Urosome a pointed oval, rather elongate, with minute preterminal uropoda.

The cephalosome is small, resting in a shallow crescentic depression of the first segment of the mesosome, which has nearly twice its diameter. Near the posterolateral margins arise long slender stalks which bear small, apparently simple eyes. These stalks are unjointed prolongations of the cephalosome, and in length they are nearly half its diameter.

Of the mesosome the third segment is the largest and widest ; between the epimera of the fourth and fifth there is a distinct space, and the last three progressively diminish in diameter and increase in curvature, but not to any great extent. The epimera of all are rounded.

The metasome comprises a small joint and a urosome, which may be described as ovoid but attached by a short and broad peduncle.

The uropoda are very small, biramous ; the basal joint is extremely short, and each branch consists of two minute joints ; the endopodite is the most slender and is no more than a very small joint and spine.

A few setæ are scattered about the margin of both mesosome and metasome.

The first antenna is short, comprising a peduncle of two rather elongated joints, the second being the larger. The flagellum is about as long as the peduncle.

The second antenna has a peduncle of six joints, the first two are short and stout ; the third is about as long but more slender ; the fourth very short, only forming a bend in the appendage ; the fifth is rather long, and the sixth longer still ; the flagellum is short, but little longer than the last joint of the peduncle.

The mouth parts are quite normal in structure. The mandible consists of a stout process with a small but strong tooth at its anterior border ; the molar process is long and slender and armed with five teeth, of which one, the second, is larger than the rest ; there are also several stout setose spines just behind this terminal group. The palp is long, three-jointed.

The first and second pair of maxillæ do not present any special features unless it be that some of the terminal spines on the outer part of the outer lobe are really strong teeth ; the lobes of the second pair are finely serrated.

The maxilliped is of normal appearance ; the straight distal edge of the masticatory lobe bears some half-dozen stout setæ, which are finely serrated. Two

papilliform teeth occur on the inner margin. The palp is five-jointed; four joints are short and broad; the terminal one is also short, and, though much more slender, it is more correctly described as a stump. The three central joints are each provided on the inner border with two or three long setæ, and the third of the entire series is the largest.

The pereiopoda, except the first, are uniform in structure. The first is short and comparatively stout; the basis is long; the ischium little more than one-third the length; the merus is quite short and expanded distally; the carpus is a little longer, much expanded ventrally to form a round "cutting" edge which carries two stout spines. The propodus is a little longer still and similarly expanded ventrally, but not quite throughout the entire length of the joint; the dactylus is about as long, slender, and bears a slender claw distinct from the joint and a much smaller though distinct accessory. A few setæ are scattered throughout the appendage.

The other appendages are slender, but not so long as the body. The basis is little longer than the ischium; the merus is short and swollen dorsally. The other joints are comparatively long and become increasingly slender; the propodus is a little longer than the carpus, and each of these have two spinous setæ ventrally. The dactylus is slender, slightly curved, rather more than half as long as the propodus.

The pleopoda are protected by a sort of hood formed by the urosome, and the first pair forms a shield to the rest. The ovigerous female is much broader than the male.

Four specimens were taken in Winter Quarters inside the 20-fathom line in February, 1902.

NOTOPAIS.

Cephalosome broad and short, excavated in front and without eyes.

Mesosome with the three posterior segments recurved, tapering and separated from the four anterior ones.

Cephalosome and anterior segments of the mesosome spinose.

Metasome a single plate with minute terminal uropoda.

Pereiopoda, anterior ones ambulatory, posterior ones defective, very slender and not disproportionally long.

Pleopoda, first pair opercular.

The Munnopsidæ (*Ilyarachna*), to which this genus should be assigned, are notorious for the natatory character of the posterior pereiopoda. A deficiency in this respect of this appendage is, therefore, serious. The genus *Ilyarachna* seems to be its nearest relation.

NOTOPAIS SPICATUS.

(Plate VIII., fig. 1.)

Specific characters :—

Cephalosome armed dorsally, with two stout spines and two lateral ones.

Mesosome with the five anterior segments armed with four strong forwardly directed spines, the first four segments having others laterally.

Urosome triangular, truncated, with minute terminal uropoda.

The cephalosome is wide, nearly as wide as any other part of the body. Its anterior margin appears to be rounded, but close examination shows that it is deeply excavated, and the first pair of antennæ arise near the anterior border of this excavation. Not far from the rounded lateral margins of the cephalon is a small but distinct spine, and there are two more prominent dorsally, but more distant from the middle line than on succeeding segments.

The impression one receives in examining this animal is that the cephalon and first segment of the thorax are distinct, the latter being much smaller than, and above the former, a condition which occurs in the genera *Ilyarachna* and *Pseudarachna* of Prof. G. O. Sars.

Of the mesosome the first two segments are subequal, and the two following ones are also subequal but a little longer, their anterior margins are provided with four stout and prominent spines directed forwards, these are placed at approximately equal distances apart, the median pair being the largest. The epimera are rather elongated, not separable from the body, but where they might be said to arise is a small, blunt spine; the epimeron itself is in each case rounded, and about the middle of its margin is another spine not so large as the dorsal ones; an additional one arises at their anterior margins in the first, second, and fourth of these segments. The three posterior segments are separated from the preceding by a distinct waist. These segments are curved backwards; the first two are subequal, the third is about half the size; the anterior margin of the first bears four large spines similar to those on the preceding segments.

The metasome comprises a single plate, the urosome, which is a truncated triangle, its margins sloping from the mid-dorsal line. It is covered with fine setæ more thickly than the rest of the body, where they are rather sparingly distributed. The uropoda are minute, terminal, and arise ventrally. Each consists of a very small exopodite, a rather barrel-shaped and diminutive endopodite of about half the size, both terminating in a few setæ.

The first antennæ arise quite close to the middle line just below the upper margin of the cephalon; the first joint of the peduncle is very large comparatively and bears two teeth on its inner distal margin; it terminates as a cone, and on the upper surface of this are one or two short joints, I cannot be certain which it is; the flagellum is very slender and consists of a long joint, a very short joint and a long portion in which the articulations under existing conditions are indistinguishable.

Of the second antennæ only small portions remain. These arise close to the external border of the cephalon, and only four joints of the peduncles exist; the first three are very short and stout, armed externally with a stout spine; the third has a very oblique distal margin and is provided internally with several strong setæ; the fourth joint is also very small and much more slender than the others.

The animal has not been dissected at all, and from what can be seen of the maxillipeds *in situ* they are of the usual type and have a comparatively very large epignath, broad and ending in a blunt point. The palp is five-jointed, the first joint is short and broad; the second nearly three times as long; the third half as long as the preceding but narrower, the two terminals are subequal in length, rather short and setose.

The pereopoda may be described as rather long, but not disproportionately so, and very slender; most of them have been more or less severely injured. The first pair are complete and are ambulatory; they exhibit a long slender basis, an ischium rather more than half the length, a short and dorsally-expanded merus, a carpus as long as the ischium, a propodus almost equally long, and a daetylus one-third the length. Ventrally the carpus and propodus bear scattered setæ. I have not been able to distinguish any accessory claw. The other pereopoda are very similar as far as can be made out, but the proportions of the joints are rather different, and there is no accessory claw. They are too fragmentary to permit of a definite statement as to the adaptation of the posterior ones for swimming as is characteristic of the *Munnopsidæ*.

The first pleopoda are strongly developed as an operculum to the remainder, and the inner border of that of the right side is armed with four or five stout teeth.

Only a single specimen of this species was extracted from the dredge material shortly after arrival at Winter Quarters. Inside the 20-fathom line, February 28, 1902.

I have to express my sincere thanks to Messrs. West, Newman & Co. for the trouble and care they have taken in the preparation of the plates, also to Mr. F. S. Murray for other assistance.

The day after sending in the corrected proof of this Report I received from Miss Richardson a Supplementary Report on the Isopoda collected by the French Antarctic Expedition. She there records the following species:—

<i>Nototanais antarcticus</i> Hodgson.	<i>Notasellus australis</i> Hodgson.
„ <i>australis</i> .	<i>Haliacris australis</i> Hodgson.
<i>Gnathia antarctica</i> Studer.	<i>Antias charcoti</i> Richardson.
<i>Exosphæroma antarctica</i> .	<i>Austrimunna antarctica</i> Richardson.
<i>Cymodocella tubicauda</i> Pfeffer.	„ <i>serrata</i> .
<i>Serolis polita</i> Pfeffer.	„ <i>subtriangulata</i> .
<i>Austrimunna incisa</i> .	

The individuals forming this collection are rather scanty in number and the majority have apparently been more or less severely injured. Of the five new species not more than four representatives were found for any of them. *Nototanais australis* is very closely allied to *N. antarcticus*, but differs in the structure of the first appendages of the mesosome of the male. Except for this difference the resemblance is exceedingly close.

Cymodocella tubicauda.—I have dealt at length with this species.

Haliacris australis.—I think I have satisfactorily proved that this species is identical with *H. antarctica* Pfeffer, and it should be included under that name.

Austromunna serrata.—This species does not appear to be assigned to the right genus; it closely resembles my *Austronamus*, but is distinct from the species I have described.

Austromunna subtriangulata.—This comes very close to, if it is not identical with, my *Austromunna rostrata*. Only a single specimen was found and no reference is made to its legs; these might easily have been injured.

Austromunna incisa.—This species is a very close relation to my new genus *Austrosignum*, to which, I think, it should be assigned. It seems most closely allied to *A. grande*. Here again there is no information as to the legs, beyond an outline figure of the first appendage of the mesosome.

The figures which accompany the Report do not impress me greatly, but if they are to be relied on the species are not to be identified with those taken by the 'Discovery.' In the last two species, however, I very much doubt this.

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EXPLANATION OF THE PLATES.

PLATE I.

1. *Leptanthura glacialis*, ♀, × 6.
 - a. First antenna × 40.
 - b. Second antenna × 40.
 - c. Maxilla × 40.
 - d. Maxilliped × 40.
 - e. First appendage of mesosome × 40.
 - f. Second appendage of mesosome × 40.
 - g. Last appendage of the mesosome × 40.
2. *Gnathia antarctica*, ♂, × 14.
3. *Euneognathia gigas*, ♂, × 6.
 - a. Maxilliped × 15.
 - b. First appendage of mesosome × 15.

PLATE II.

1. *Aega antarctica** × 3.
 2. Maxilla × 20.
 3. Maxilliped × 20.
 4. First appendage of mesosome × 16.
 5. Sixth appendage of mesosome × 16.

PLATE III.

1. *Cirolana meridionalis*, ♀, × 2.
 2. First maxilla × 20.
 3. Second maxilla × 20.
 4. Maxilliped × 20.
 5. First appendage of mesosome × 7.
 6. Sixth appendage of mesosome × 7.

PLATE IV.

1. *Serolis trilobitoides*, ♂, × 1, dorsal aspect.
 2. The same, ventral aspect.
 3. Specialised seta from mandibular palp, terminal joint × 312.
 4. First maxilla × 20.
 5. Second maxilla × 20.
 6. Maxilliped × 20.
 7. Sensory spine from propodus of second thoracic appendage × 312.
 8. Sensory lamella from propodus of second thoracic appendage × 312.

PLATE V.

Antarcturus.

1. *A. adareanus*, ♀, × 3.
2. *A. franklini*, ♀, × 3.
3. *A. australis*, ♂, × 3. (This is the male of *A. franklini*.)

* Not *Ae. australis*, as on the plate.

PLATE VI.

Antarcturus.

1. *A. hiemalis*, ♂, $\times 3$.
 - 1a. First antenna $\times 20$.
 - b. First maxilla $\times 20$.
 - c. Second maxilla $\times 20$.
 - d. Maxilliped $\times 20$.
 - e. First appendage of mesosome $\times 12$.
2. *A. meridionalis*, ♂, $\times 3$.

PLATE VII.

1. *Glyptonotus acutus*, ♂, $\times 1$.
2. First maxilla $\times 6$.
3. Second maxilla $\times 6$.
4. Maxilliped $\times 6$.
5. First appendage of mesosome $\times 2$.

PLATE VIII.

1. *Notopais spicatus*, ♂, $\times 27$.
2. *Austrofilus furcatus*, ♂, $\times 30$.
 - 2a. Mandible $\times 200$.
 - b. First maxilla $\times 200$.
 - c. Second maxilla $\times 200$.
 - d. Maxilliped $\times 150$.
3. *Austronanus glacialis*, ♂, $\times 70$.

PLATE IX.

1. *Antias charcoti* $\times 27$.
2. *Coulmannia australis*, ♂, $\times 20$.
 - 2a. Maxilliped $\times 104$.
3. *Notoxenus spinifer*, ♂, $\times 27$.
 - 2a. Maxilliped $\times 200$.

PLATE X.

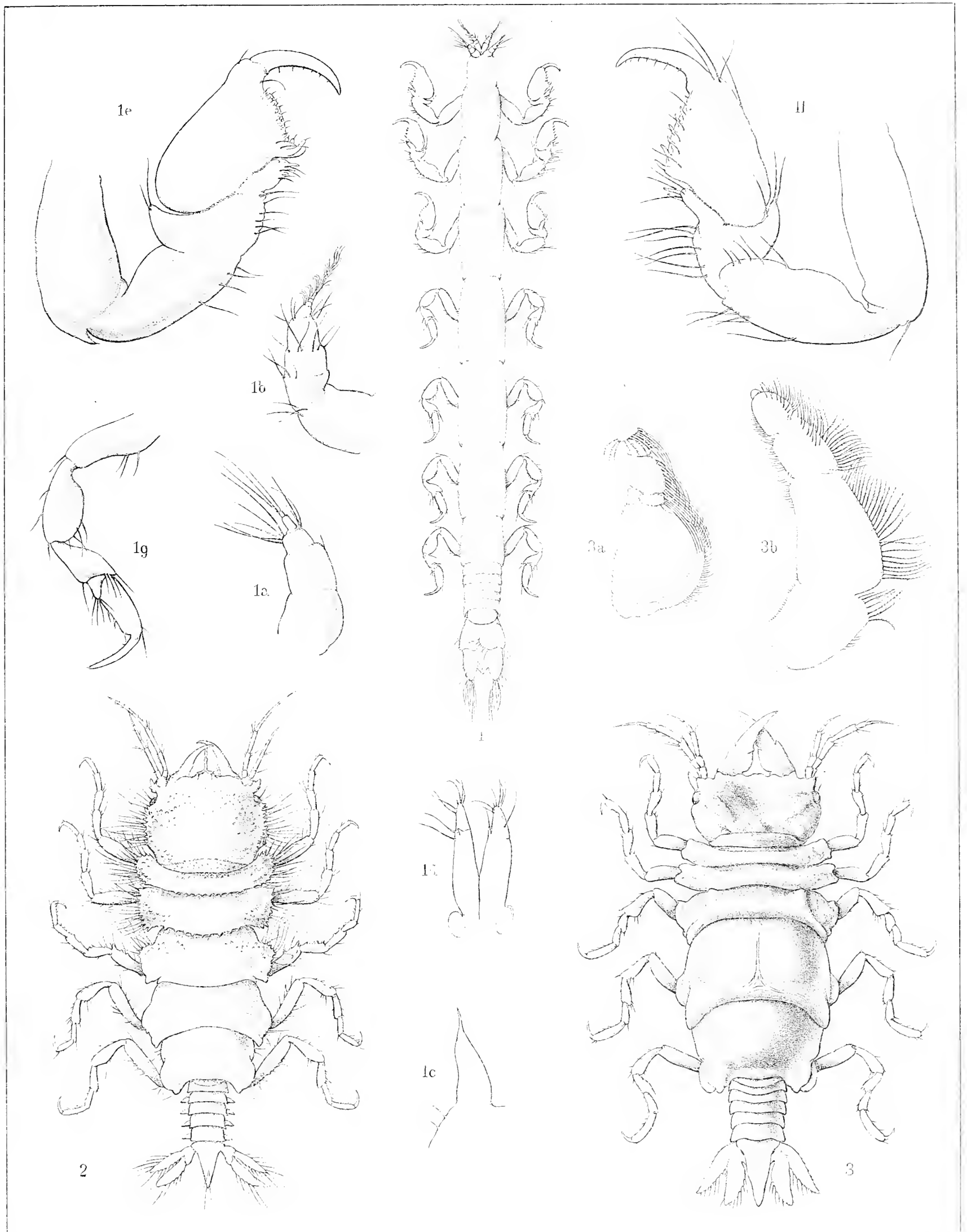
1. *Austrosignum grande* ♂, $\times 27$.
2. *Austrosignum glaciale*, ♂, $\times 27$.
3. *Austromunna rostrata*, ♂, $\times 27$.

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 americanus (*Arcturus*), 4.
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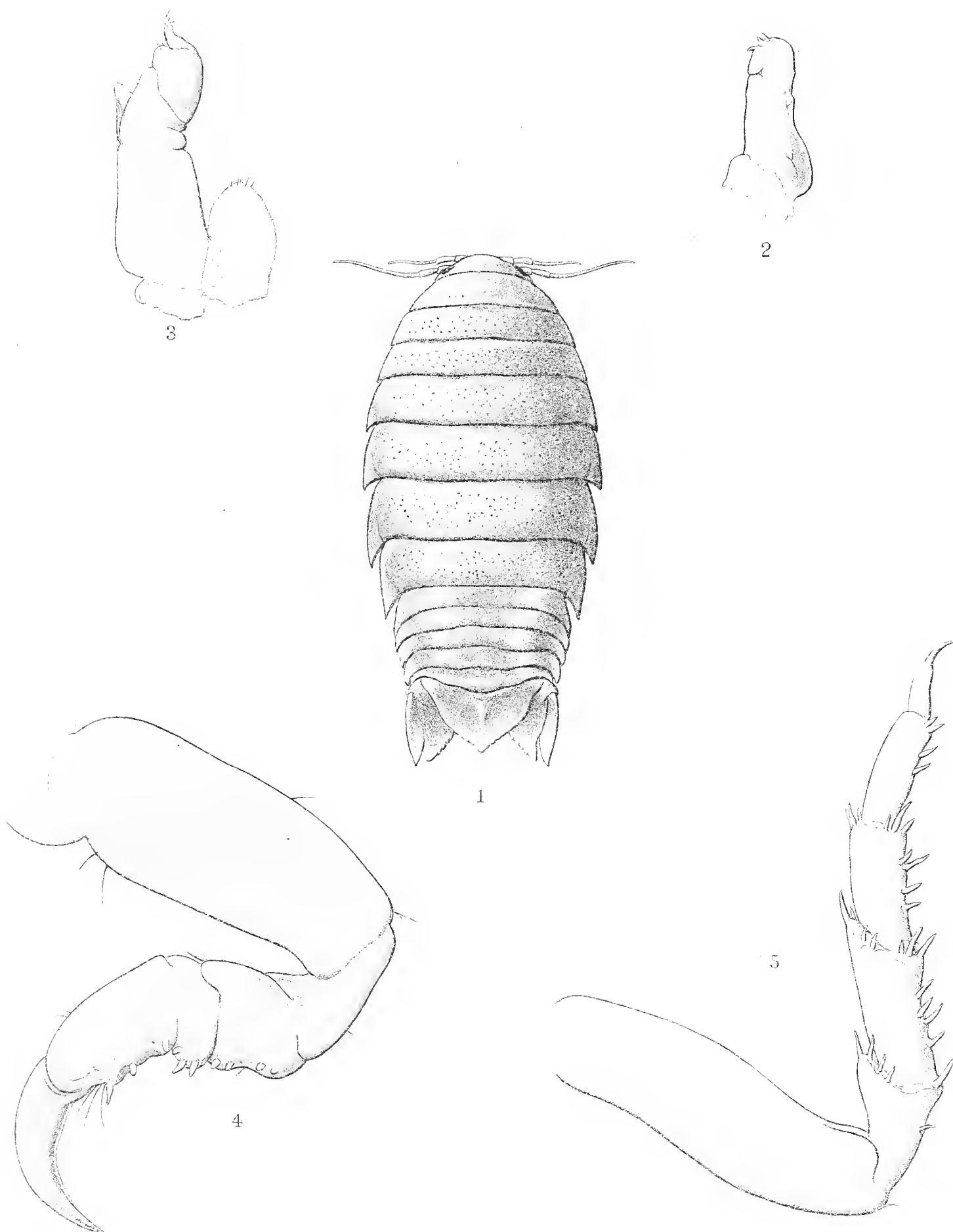
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- willemoesi* (Tanais), 3.



West, Newman del et lith

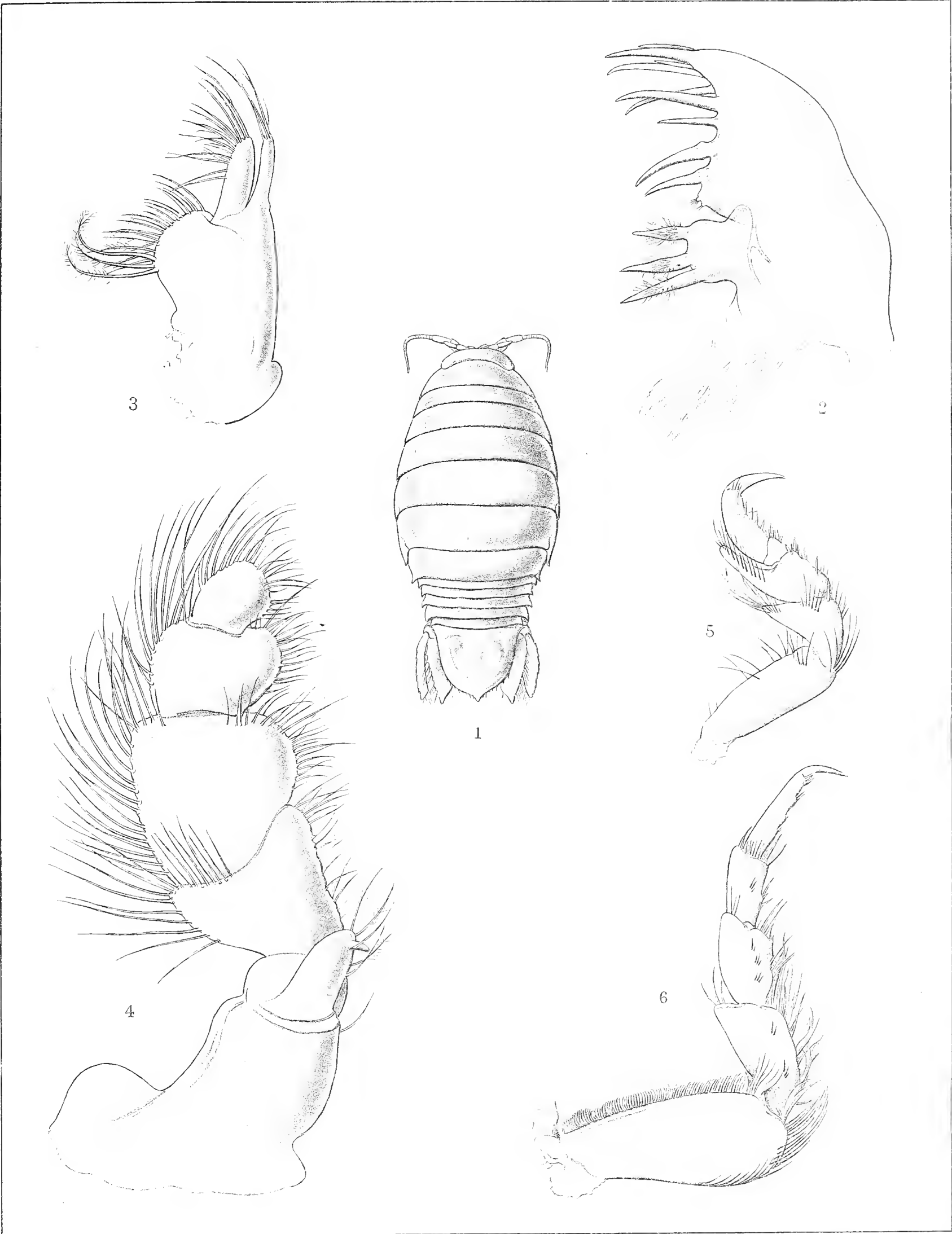
1. *Leptanthura glacialis*. 2. *Gnathia antarctica*. 3. *Euneognathia gigas*.





Æga australis.

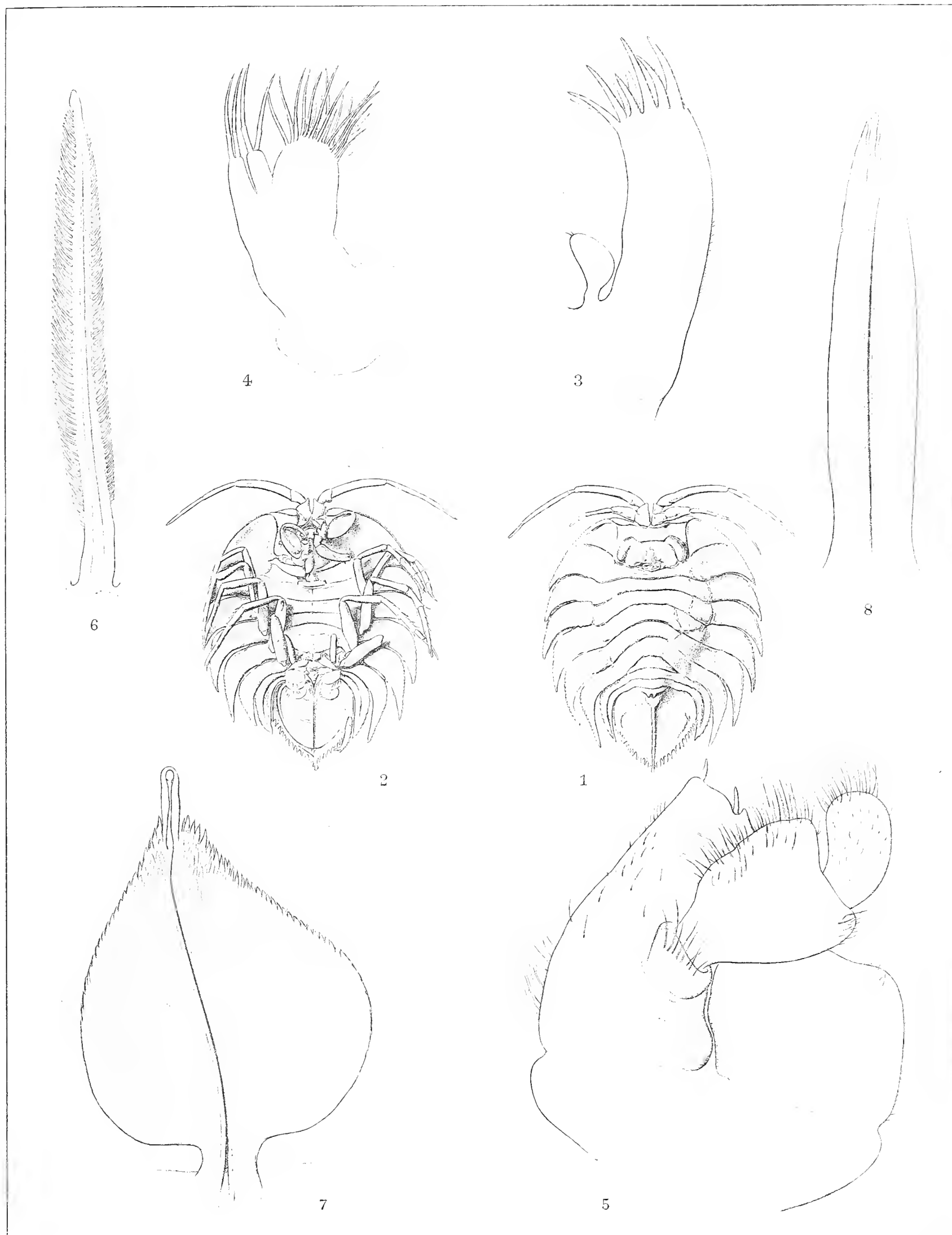




Cirolana meridionalis.

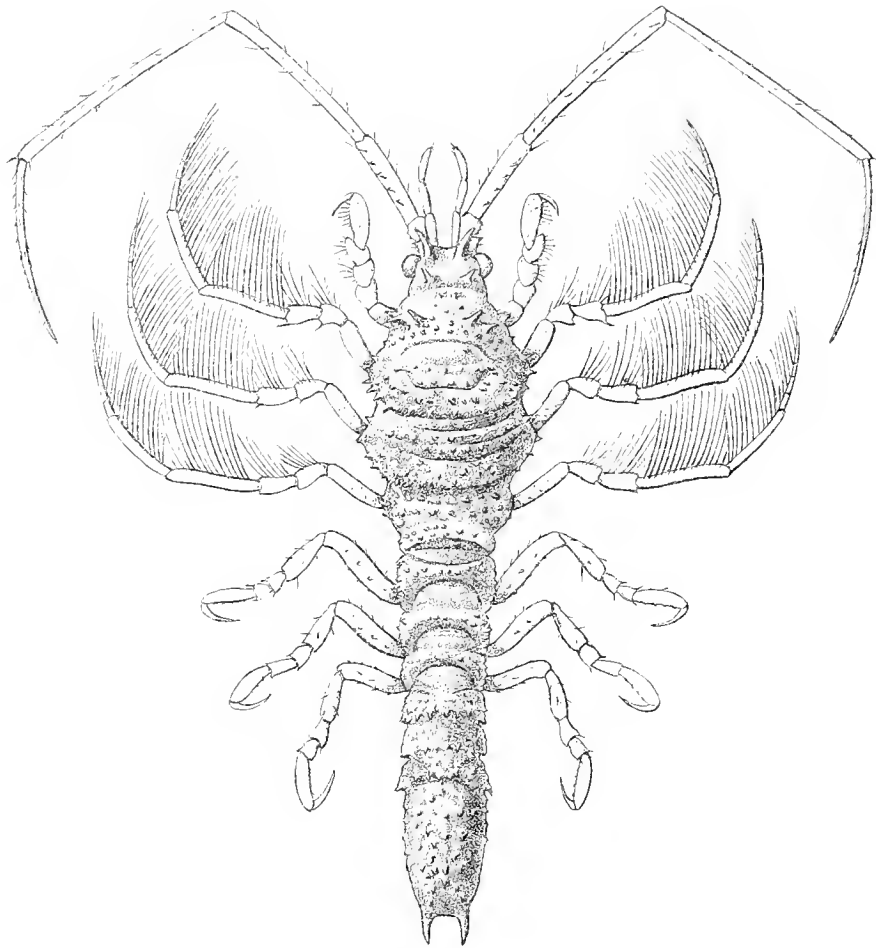
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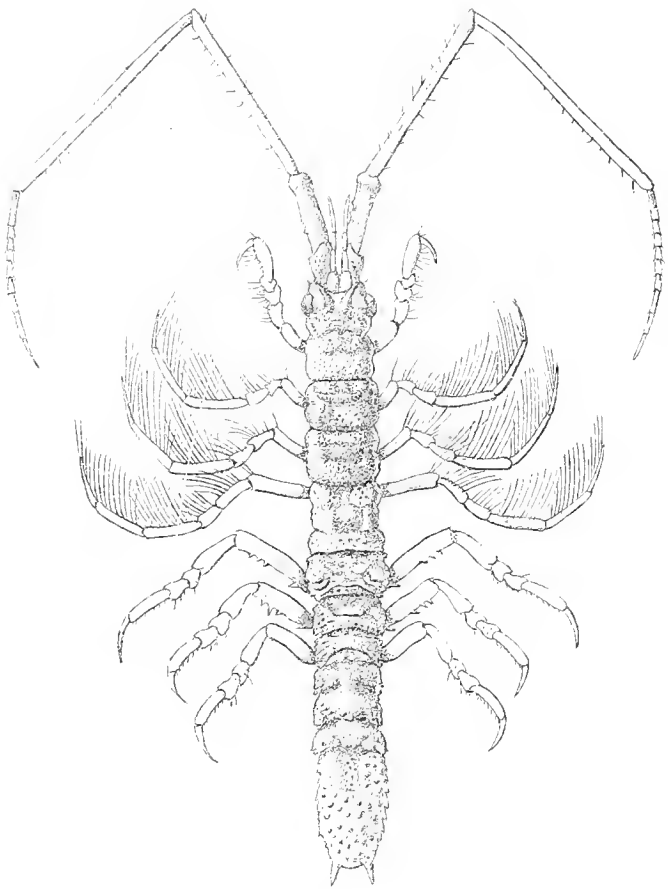


Serolis trilobitoides.

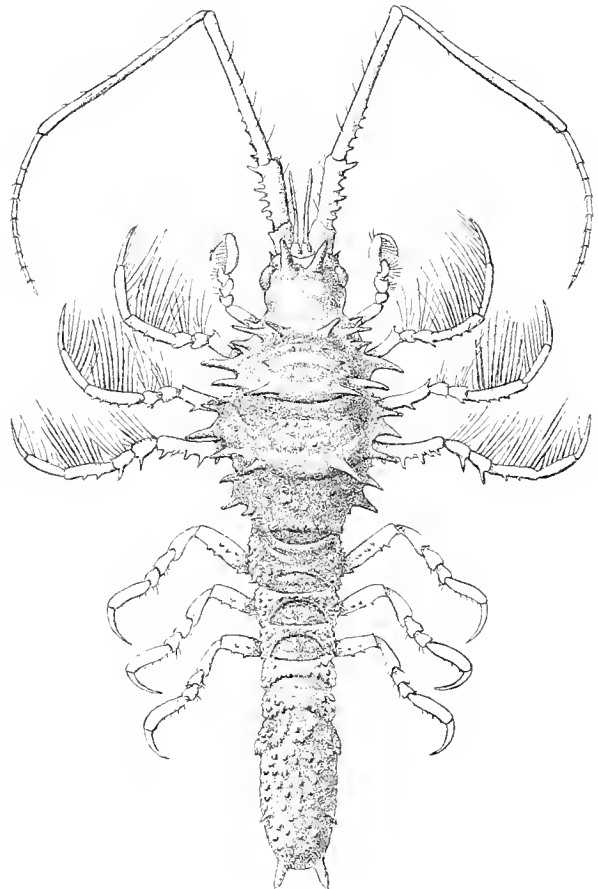




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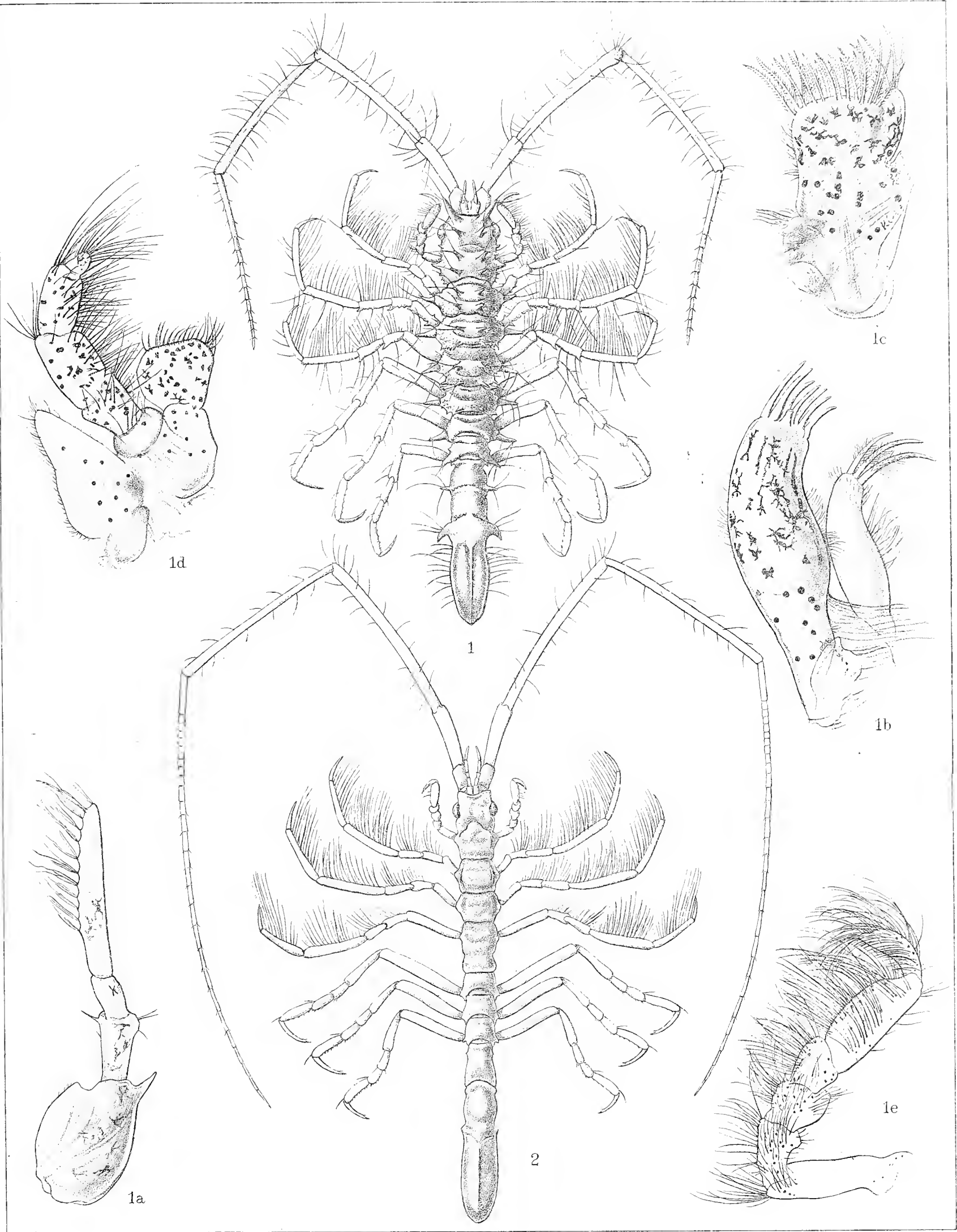


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Antarcturus.

1. *A. adareanus*. 2. *A. australis*. 3. *A. franklini*.

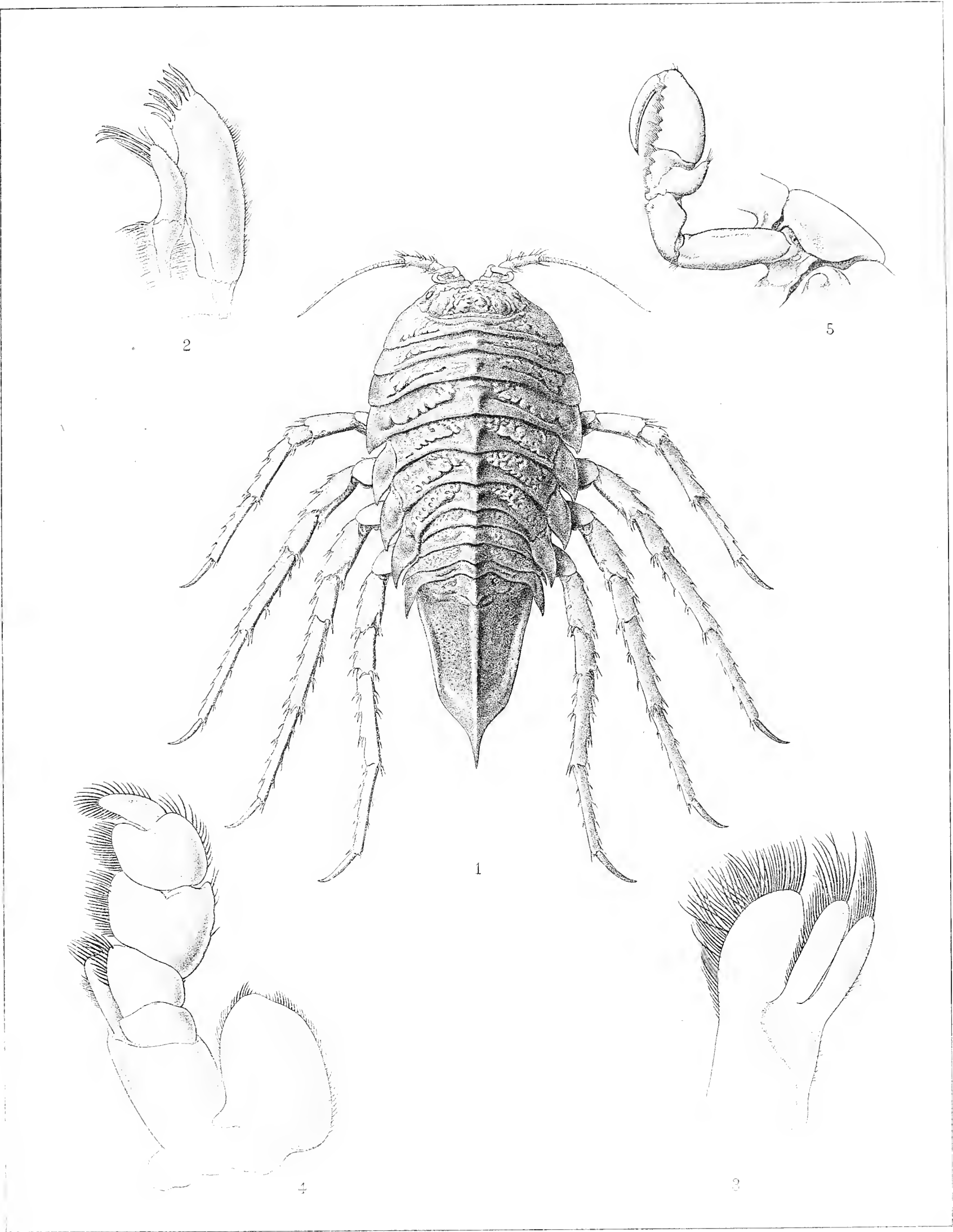




Antarcturus.
1. A. hiemalis. 2. A. meridionalis.

West, Newman del et lith.

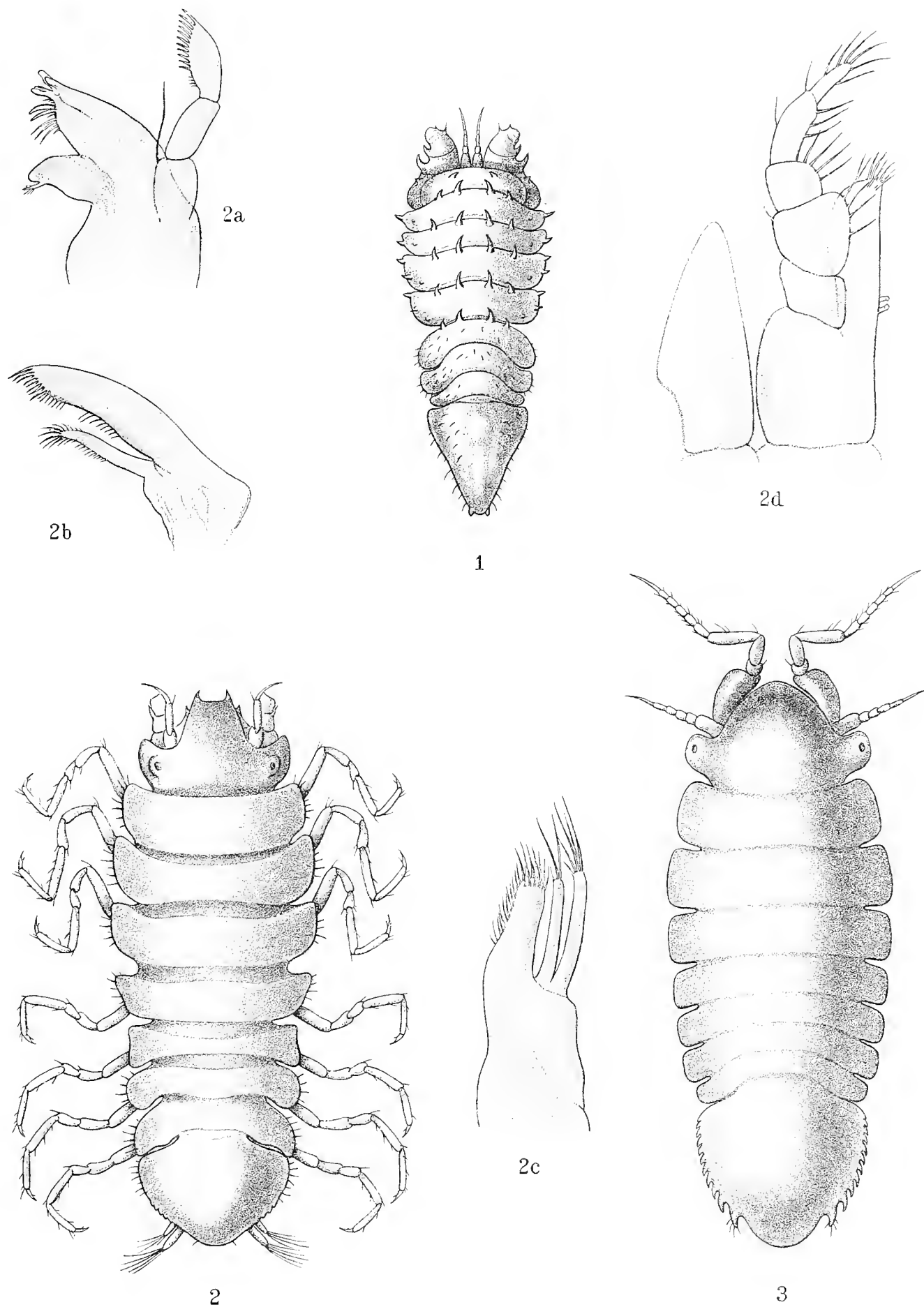




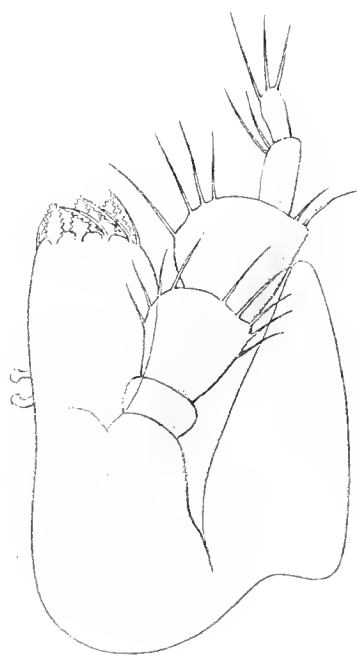
Glyptonotus acutus.

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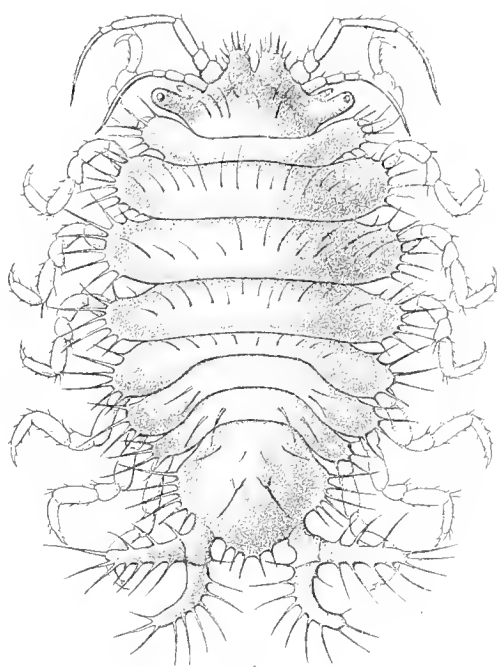




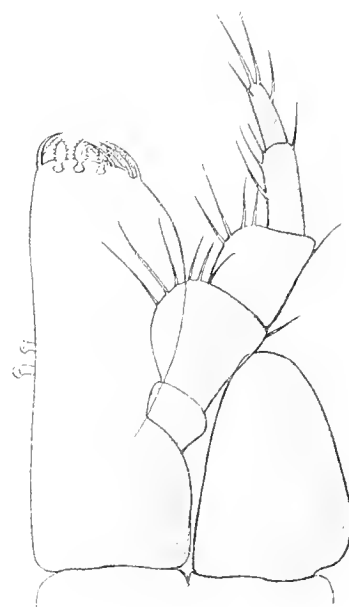




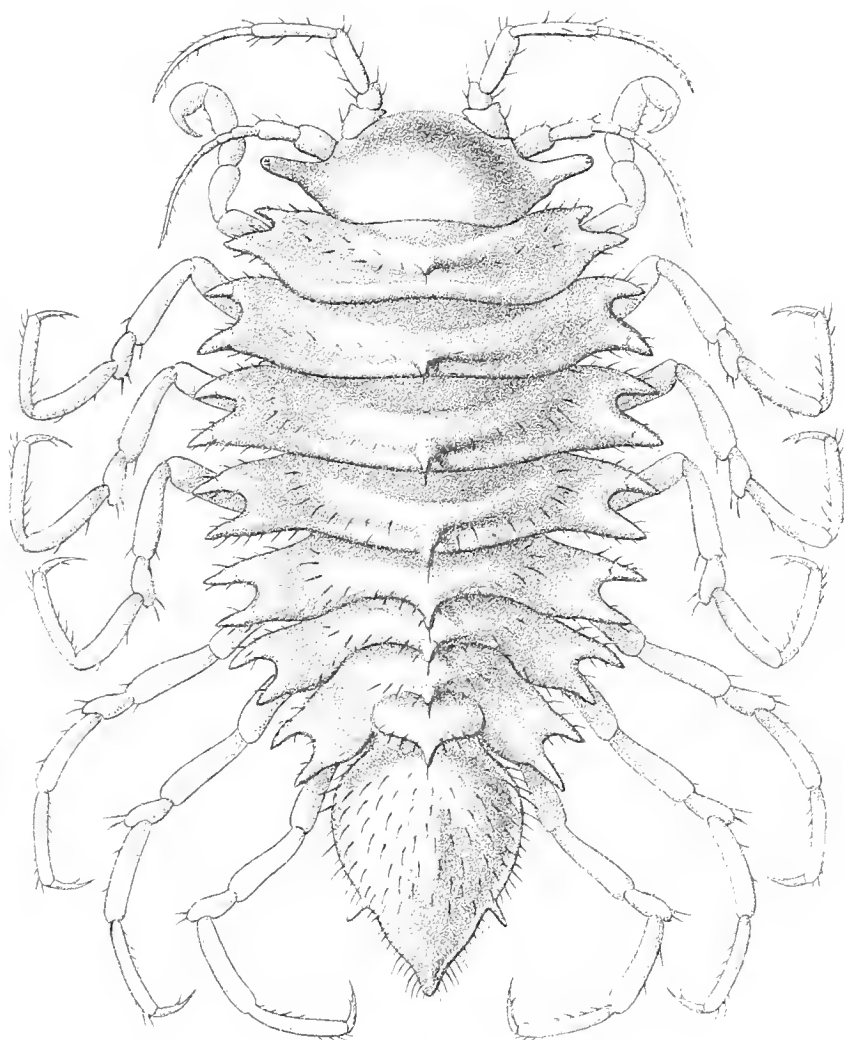
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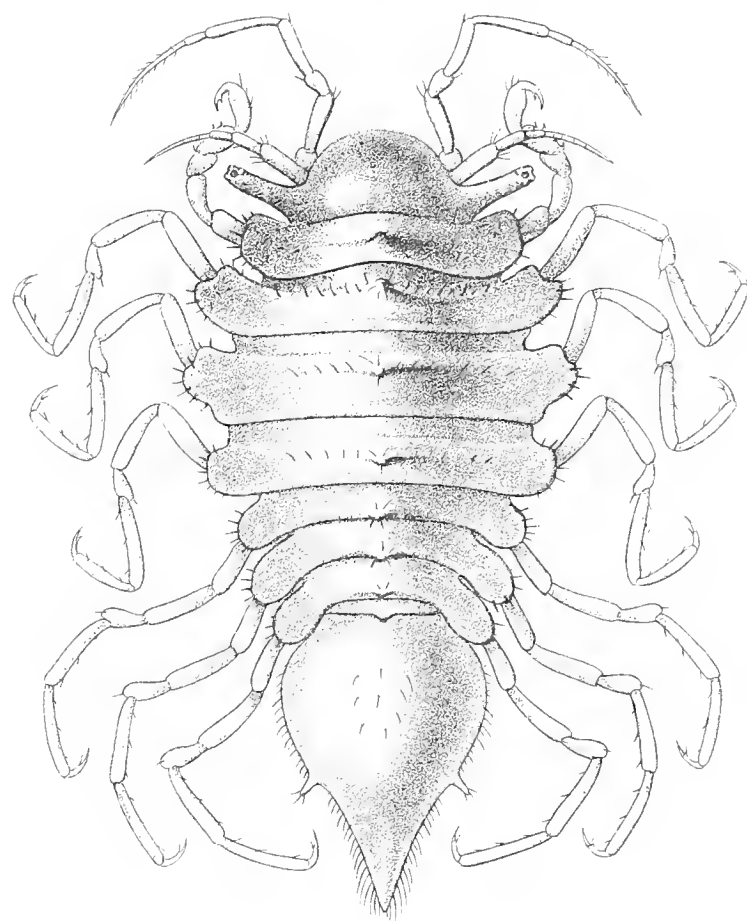
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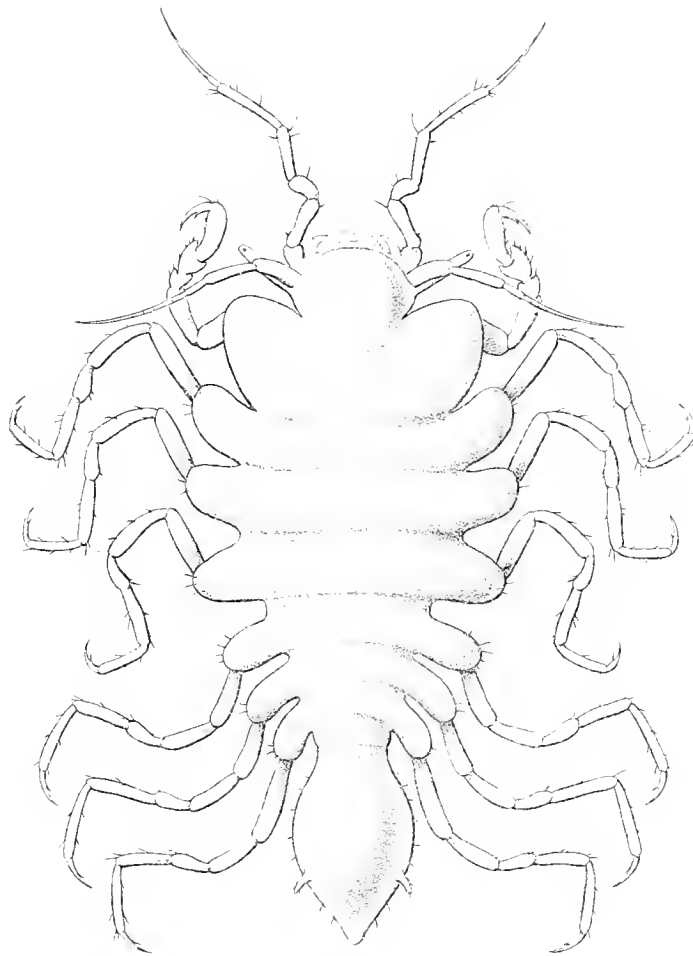


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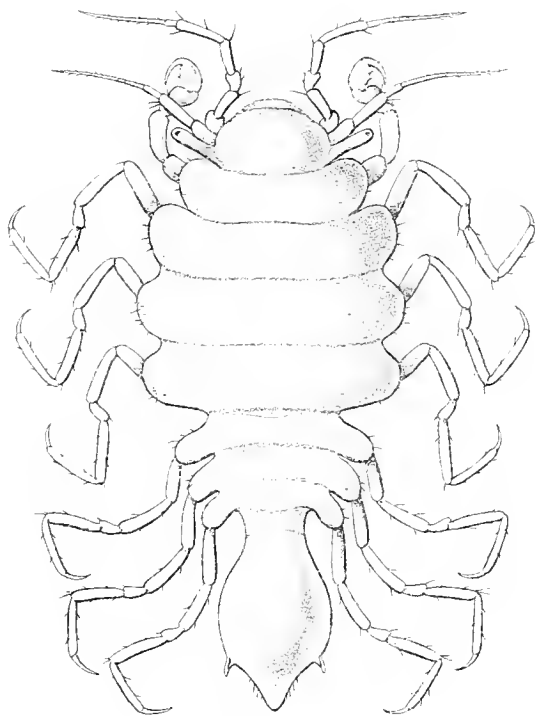


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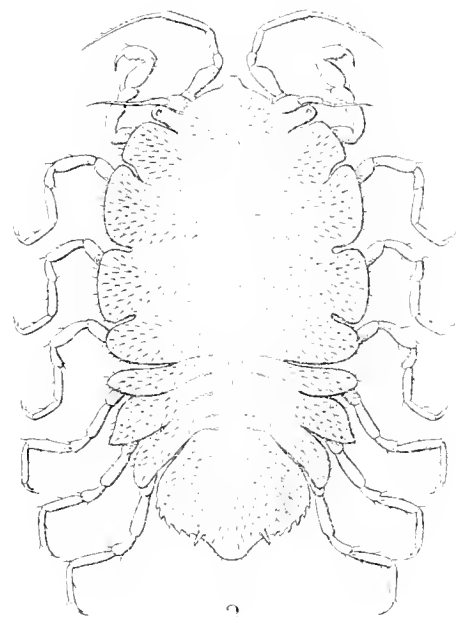




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Scott's biologist

The finding of an old microscope marked "Discovery" at Guy's Hospital has led to the presentation of a mixed collection of objects to the Discovery in the Thames. The microscope belonged to one of Scott's party, the biologist T. V. Hodgson, whose name is painted large over one of the cabins in the ship. Hodgson, who later became curator of Plymouth Museum, was much praised by Scott in his diaries and passed on the expedition's biological surveys to the British Museum. Guy's Hospital offered his microscope to the ship as a relic of the trip, and its acceptance brought more offers from people connected with the hospital and from Hodgson's surviving sister, Miss R. V. Hodgson.

The collection has now arrived, and will go on show later. It includes a number of birds' eggs—some large sea shells, leaves picked on Table Mountain on the way out, and chips of rock. A gun harpoon, various menus, one with Scott's signature, a wolfskin, and games for the crew such as "Hindoo's Spiral Puzzle" and "Object dominoes," are other items. Lieutenant R. K. Ledson, who is in charge of the collection, wants to find out more about Hodgson and identify all the objects. Then they will be put in the biologist's cabin, in a special case to be made between its two bunks.

Scott's biologist

PYCNOGONIDA.

BY T. V. HODGSON, F.L.S.

(10 Plates.)

THE collection of Pycnogonids brought from the Antarctic by the 'Discovery' is a large one, including as it does no less than twenty-eight species, three of which have been assigned to as many new genera. Only one species can be regarded as of morphological importance, *Pentanymphe antarcticum*, which is now known to be abundant and to have a circumpolar distribution. It differs from the genus *Nymphon* only in the possession of an additional pair of legs. At first this was thought to be quite a novel feature in the morphology of the Pycnogonida, but the Scotch expedition brought another and much finer species from the South Orkneys. This proved to be identical with *Decolopoda australis*, described by Eights some seventy years ago, and taken at the South Shetlands. Eights' work was lost for a long time, and though it has been noticed recently by modern zoologists, the reception afforded it was extremely curious, involving as it did the point-blank refusal to accept the possibility of the existence of a Pycnogonid with more than the orthodox four pairs of legs. Mr. L. J. Cole (7), who apparently looked with more sympathy on the work of a fellow-countryman, was the first to appreciate this discovery properly. The genus *Leionymphon* was defined by Professor Möbius for a large but immature specimen taken by the 'Valdivia' in the vicinity of Bouvet Island. It has been found necessary to re-cast this genus; as now defined it contains no less than eight species, including two which had been assigned to the genus *Ammonothea*, and another which Professor Möbius thought should be placed in the genus *Colossendeis*. No less than five species were taken by the 'Discovery,' and four of them are new. No true member of the genus *Ammonothea* was seen, but two new species assigned to new genera, *Austrodecus* and *Austroraptus*, belong, as does the genus *Leionymphon*, to the family *Ammonotheidæ* as defined by Professor G. O. Sars.

Austrodecus is perhaps a close relation of *Tanystylum*, Miers, and is a curious little form with a slender and elongated proboscis, like the snout of a weevil beetle, no cheliferi, six jointed palps, and small ovigers. *Austroraptus* is remarkable for its spurred body and the length of its legs.

Rhynchothorax australis is another curious form; the only other species of the genus is found in the Mediterranean, but, notwithstanding certain differences, there does not seem to be any justification for giving the 'Discovery' species other than specific rank.

								Antarctic.	Sub-Antarctic.
	<i>Leionymphon</i>	<i>clausii</i> , Pfeffer.	.	.	.	.	.		×
*	„	<i>australe</i>	.	.	.	.	.	×
/ *	„	<i>glaciale</i>	.	.	.	.	.	×
„ *	„	<i>spinosum</i>	.	.	.	.	.	×
	<i>Ammonothea</i>	<i>hoekii</i> , Pfeffer	.	.	.	.	.		×
	„	<i>wilsoni</i> , Schimkewitsch	.	.	.	.	.		×
	„	<i>communis</i> , Bouvier	.	.	.	.	.	×
	„	<i>curculio</i> , Bouvier	.	.	.	.	.	×
	<i>Tanystylum</i>	<i>styligerum</i> , Miers	.	.	.	.	.		×
	„	<i>dohrnii</i> , Pfeffer	.	.	.	.	.		×
	„	<i>chierchiaë</i> , Schimkewitsch	.	.	.	.	.		×
*	<i>Austrodecus</i>	<i>glaciale</i>	.	.	.	.	.	×
*	<i>Austroraptus</i>	<i>polaris</i>	.	.	.	.	.	×
	<i>Ascorhynchus</i>	<i>glaber</i> , Hoek	.	.	.	.	.		×
*	<i>Rhynchothorax</i>	<i>australis</i>	.	.	.	.	.	×
	<i>Colossendeis</i>	<i>gigas</i> , Hoek	.	.	.	.	.		×
	„	<i>leptorhynchus</i> , Hoek	.	.	.	.	.		×
	„	<i>gigas leptorhynchus</i> , Hoek	.	.	.	.	.		×
	„	<i>megalonyx</i> , Hoek	.	.	.	.	.		×
	„	<i>robusta</i> , Hoek	.	.	.	.	.		×
	„	<i>gracilis</i> , Hoek	.	.	.	.	.		×
*	„	<i>australis</i>	.	.	.	.	.	×
*	„	<i>glacialis</i>	.	.	.	.	.	×
*	„	<i>frigida</i>	.	.	.	.	.	×
*	„	<i>rugosa</i>	.	.	.	.	.	×
	<i>Decolopoda</i> †	<i>australis</i> , Eights	.	.	.	.	.	×
	„	<i>antarctica</i> , Bouvier	.	.	.	.	.	×

No less than seven expeditions have taken part in the recent "Siege of the South Pole," and the collections of Pycnogonids made by four of them still remain unpublished. This being the case, it is scarcely desirable to enter into a discussion on the geographical distribution of these animals. It may, however, be stated that the head-quarters of these animals appears to be in southern seas. Professor Möbius (22) has compiled a list of the known Arctic and sub-Arctic species, which number forty-two. In the same work, for comparison, he has added a list of all the species taken beyond 30° South latitude. Only thirty-one species are included in this large area, and the genus *Tanystylum* is the only one occurring in the south which does not occur in the north. I have reduced the Southern or Antarctic area to what I consider more reasonable dimensions, and the 'Discovery' collection, with its predecessors, raises the total to sixty-three species. Among these species there are five new genera; four of these are, as far as is yet known, confined exclusively to the Antarctic region, the other extends well into the sub-Antarctic region. The "Bipolarity Theory" is only affected by a single species, *Colossendeis australis*. Of all the numerous species of this genus, *C. proboscidea*, from the north, and *C. australis*, from the south, stand apart from all the rest on account of their bodily form, and there can be no question that they are much more nearly related to each other than

† [As Eights said his species had "five perfect pairs" of legs he doubtless meant to write *Decaholopoda*.—ED.]

to any other members of the genus. The two species, as species are recognised now-a-days, are perfectly distinct, but it is a fair question to ask how is their present position at the opposite ends of the earth to be accounted for?

As to the terms employed in the following work, some words of explanation are necessary.

Naturalists have not always used the same terminology, and Mr. L. J. Cole (6) has recently tabulated the essential variations. As, however, the terms used by any one naturalist have not been fully adopted, and others have been introduced, a complete account of the terminology used here is given.

The entire Body of a Pycnogonid is divisible into three regions—the proboscis, trunk, and abdomen—and this without regard to any of the appendages. Where the body only is alluded to, it is to be understood that both the trunk and abdomen are taken together. Measurements are taken dorsally, unless otherwise specified, except in the case of the appendages, which are generally measured from the side, and the length of the trunk is usually taken to the base of the abdomen; in exceptional cases, where the abdomen is vertical or very short, the trunk may be measured to the extremity of the posterior lateral processes, but this is so stated. Its width is always across the longest of the lateral processes.

The Cephalon is regarded as that portion of the trunk which lies in front of the first pair of lateral processes, and the so-called neck is the narrowest part, sometimes elongated, between those processes and the more expanded distal portion.

Segmentation is not regarded as perfect or complete unless the four segments of the trunk and the abdomen are distinctly articulated.

The first appendage of the trunk is the Cheliforus, also commonly known as the mandible. A considerable amount of confusion has been, and is still likely to be, caused by the fact that the chela has most frequently been regarded as a single joint. Obviously it consists morphologically of two joints, and in order to avoid any misapprehension as to the number of joints, this appendage has been described as chelate, or otherwise, and the scape, a name given by Professor G. O. Sars to the shaft supporting the chela, has been recorded as one- or two-jointed, as the case might be. This method of dealing with the limb is suggested in order to avoid confusion as to the number of joints it possesses.

The second appendage is the Palp.

The third appendage is the Oviger. This convenient name was given by Mr. L. J. Cole to replace the more cumbrous term “ovigerous,” or “false leg.” In these two appendages the various joints are numbered from the base, and not named.

The remaining four or five pairs of appendages are Legs pure and simple; with the use of the word “oviger,” the qualification “ambulatory” or “walking leg” becomes quite unnecessary. The terms used for the individual joints are those adopted by Professor G. O. Sars, viz., first, second and third coxa, femur, first and second tibia, tarsus and propodus.

A projection beyond the insertion of the terminal claw, which occurs in some species, is called the Heel, a term introduced by Mr. L. J. Cole. Two other expressions have been adopted for purposes of convenience. In very many species, not to say genera, there occurs a thickening of the skin on the sides of the legs, not infrequently also on some of the other appendages; this takes the form of a narrow and conspicuous line, usually of a reddish colour, and so it has been termed the "lateral line." The other feature concerns the setæ. At the extremity of most of the joints there is a fringe of more or less specialised setæ, sometimes surrounding the joint, but frequently more conspicuous on the dorsal or the ventral aspect. This has been termed the distal fringe, a name which does not appear to be inappropriate.

Precise measurements are invariably necessary with regard to the legs. One leg is generally considered to be sufficient for this purpose, and as Dr. P. P. C. Hoek adopted the third leg of the right side for this purpose wherever possible, the same limb has been used here.

PHOXICHILUS.

This genus is readily distinguished by its slender form and the complete absence of chelifori and palps. The ovigers too only occur in the male, and are seven-jointed. Among other characters may be mentioned the presence of a "collar" between the cephalon and the proboscis. This, however, is deficient in the species described below.

Numerous species have been assigned to this genus, but the difficulties of species discrimination is increased by the absence of two of the normal number of appendages, and necessitates some modification of the generic characters. No less than six species have been described from European seas, but their specific distinctness is open to question. Three others have been found in distant seas, and a fourth now described is from the extreme south.

PHOXICHILUS AUSTRALIS. ✓

(Plate I., fig. 1.)

Specific characters :—

Body slender, with lateral processes very widely separated and with the long legs completely covered with very minute stiff setæ.

Tarsus with a very prominent ventral spine, and three to five proximally on the propodus, which projects distinctly beyond the insertion of the terminal claw and auxiliaries.

No distinct collar anteriorly to cephalon.

Body slender, with the lateral processes long and very widely separated; perfectly smooth to unassisted vision, but with a 1-in. objective extremely minute spines can be detected; segmentation very prominent and immediately behind each pair of lateral processes.

The Cephalon is small, but stouter than the trunk, truncated anteriorly with the angles bevelled off. No collar exists as such, but a band of thin chitinous skin, characteristic of an articulation, occurs between the cephalon and the base of the proboscis.

The Ocular tubercle lies almost in the middle of the cephalon, but scarcely clear of the first pair of lateral processes. It is very stout, of no great elevation, terminating in a strong cone above the four eyes.

The Abdomen is small, cylindrical, terminating in a cone, and directed almost vertically upwards. It is not articulated to the trunk.

The length of the trunk is 5mm. (to extremity of posterior lateral processes) and its extreme width is 3mm.

The Proboscis is long and slender, scarcely 4mm. in length, flexibly united to the trunk. It is cylindrical, but very slightly swollen before the middle and equally slightly narrowed before its rounded extremity. The mouth is inconspicuous, but of normal size. The proboscis is covered, more especially distally, with extremely minute spines.

The Legs are long and slender, attaining a length of 30mm. The first coxa is the smallest, and the second is a trifle longer than the first and third together; the proportions of the three following joints are as 8 : 6.75 : 8.5; the tarsus is very small, and the propodus, which is curved, is about a quarter the length of the femur. The entire limb, as the trunk, is completely clothed with extremely minute stiff setæ, which for the most part are only visible with a powerful lens. On the tibia they are, however, rather more conspicuous, besides being most abundant. The larger or ventral surface of the tarsus is covered with short spines, but one distal one is extremely large and prominent. Dorsally the propodus is covered with the minute stiff setæ, ventrally there are at the proximal end of the joint three to five very large spines, the remainder of that surface being occupied by a band of much smaller though still conspicuous spines of rather irregular size. A prominent heel projects over the insertion of a powerful terminal claw and its two auxiliaries, these latter being about half its length, but much more slender. The second coxa bears dorsally, just beyond the middle of its length, a tubercular enlargement, which is perforated by a glandular opening.

The genital apertures occur on a transverse ridge at the extremity of the second coxa of every leg. Ventrally, in the angle formed by the first pair of lateral processes and the trunk, there is a very small but distinct process on each side, exactly in the position where the oviger should be.

This type specimen is a female, and was taken off Flagon Point in Winter Quarters in 5-20 fm., on very rough ground.

Two other females were taken, one slightly larger than the type came from 125 fm., on a bottom composed of small stones and organic débris; the other is much smaller, but the precise point at which it was captured in Winter Quarters remains uncertain. A fourth specimen is a male, and is to a considerable extent overgrown with polyzoa. This specimen was taken at the same time and place as the type. It is sexually mature, and the genital apertures occur on the three posterior legs only. The ovigers are well-developed, but unfortunately only four basal joints remain on either side. They arise in the angle formed by the first lateral process and the trunk,

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but not on a body process ; the first joint is small, the second is a little longer, the two following which are longer still, the fourth is largest. The appendage bears a moderate number of minute setæ.

I have been unable to distinguish the cement glands on the femur as described and figured by Professor G. H. Carpenter for other species. (4 and 5.)

PSEUDOPALLENE.

This genus, established by Mr. E. B. Wilson in 1878, has been more completely defined in accordance with modern requirements by Professor G. O. Sars (25). It is very closely allied to *Cordylochele* (G. O. Sars), but the special features which distinguish it from that genus are (*a*) the crown of setæ at the distal extremity of the proboscis ; (*b*) the presence of spines on the body and legs.

Two species are now described, one of which I regard for the present as identical with those derived from the 'Valdivia' and 'Français' Expeditions.

PSEUDOPALLENE CORNIGERA. ✓

(Plate I., fig. 3.)

Pseudopallene cornigera, Möbius (23). p. 186.

Cordylochele turqueti (?), Bouvier (2). p. 297.

Specific characters :—

Body with long lateral processes not very widely separated, these armed dorsally with a stout spur. A pair of similar spurs on the cephalon.

Legs with longitudinal rows of setæ set in small tubercular bases. Propodus well covered with setæ and a proximal group ventrally of half-a-dozen spines.

Oviger ten-jointed. Denticulate spines with three strong teeth at the base.

Body rather robust, with long lateral processes not very widely separated. The length of these processes is increased by a very prominent spur which occurs dorsally on each.

A very conspicuous spur occurs on the antero-lateral border of the Cephalon. This is rather long, with a definitely constricted neck, and widens considerably into two lobes bearing the chelifori, and between which the proboscis arises.

The Ocular tubercle is short and stout, rounded above, and bears four well-developed eyes. It lies between the first pair of lateral processes and the neck.

The Abdomen is of normal proportions, gently tapering, and not articulated to the trunk. It is directed upwards, but does not extend beyond the posterior lateral processes, and bears a few minute setæ. The segmentation is distinct.

The length of the body is 6mm., and its extreme width is barely 5mm.

The Proboscis is ventral in origin, rising apparently from a pocket between the chelifori, directed obliquely downwards. It is a little longer than the cephalic segment gently tapering to a blunt point, the small triangular mouth being surrounded by a tuft of small bristles.

The Chelifori are well-developed; the scape is single-jointed, about two-thirds the length of the proboscis, enlarged at its distal extremity, and carries a few minute setæ. The chelæ are massive, curved almost to a right angle near their bases, and thickly covered with minute setæ. The fingers are short and massive, the immovable one bears two tubercles distally, but the movable one has none.

Palps are not present, but on either side of the cephalon ventrally, and just outside the chelifori, there is a small mark, an indication of where they should be. The antero-ventral margin of the cephalon is a slightly curved line.

The Oviger (fig. 3) is ten-jointed, and is built on much the same lines as in the genus *Nymphon*. It arises on a very small body-process between the neck and the first lateral process. The first three joints are small and progressively increase in length, the third being slightly curved and having a very oblique distal termination. The fourth joint is rather longer than the three preceding ones together; it is stout, curved, and like them, scantily supplied with small setæ. The fifth joint is very long and slender; owing to the curves it is difficult to measure precisely, but it appears to be as long as or longer than the preceding four joints. Its distal half bears a bunch of about forty large eggs, and is terminated by a short lobe. The sixth joint is quite short; the seventh and eighth are longer and sub-equal; the ninth and tenth progressively shorten, but only by a very little, the last one being slightly curved. The terminal claw is worn down to a stump, but appears to have been slender. The four terminal joints each bear a row of denticulate spines and a few small setæ dorsally. The spines are much worn, and only a flattened ovate leaf can be distinguished, with traces of three or four lateral teeth.

Fig. 3a is from a younger specimen.

The Legs are not very long, only attaining a length of about 23mm. Of the three coxæ the second is quite as long as the other two together, and is enlarged distally. The first shows a trace of a distal spur which gives it a rather angular appearance, and the setæ of the distal fringe arise for the most part on tubercular enlargements of the joint. On the second coxa the setæ are linear and dorsal, those of the mid-dorsal row are socketed into small tubercular enlargements of the joint. The third coxa bears a few small setæ dorsally, and a poorly developed distal fringe ventrally. The three following joints are very nearly equal in length, *circa* 5mm., but the advantage is with the second tibia. On the femur there are five rows of setæ dorsally and laterally, three of which are readily seen, the setæ usually arising from a small tubercle; the other two rows are less conspicuous and contain fewer setæ. In the mid-ventral line there is a row of comparatively stout tubercles. On the two tibiæ the setæ are very much more numerous, and their linear arrangement and tubercular bases are less distinct. They cover both dorsal and ventral surfaces, but a space above the lateral line is left bare. The lateral line is distinct from the first coxa to the end of the second tibia. The distal fringes, though present, are composed of setæ of moderate size, and are therefore inconspicuous. The tarsus is very small and cup-shaped, its ventral surface being

completely covered with stiff setæ, largest distally. The propodus is curved, with a very distinct swelling ventrally at the proximal end; this swelling bears half-a-dozen strong spines, the rest of the ventral surface being occupied by a band of stout spinous setæ about half the size of the proximal group. Dorsally the setæ are fewer and weaker, a narrow space appears devoid of them laterally. The terminal claw is long and slender, about two-thirds the length of the propodus, to which it is articulated at the ventral angle. There are no auxiliaries, and the projecting heel is small.

The Genital apertures of the male occur on the second coxæ of the two posterior pairs of legs; in the female they occur on all the legs, on a conspicuous swelling of the coxa.

The adult male bearing ova, described above, was taken in Winter Quarters in 125 fathoms, on a bottom of small stones and organic débris (June 6, 1903). A smaller specimen, taken at the same time and place, is rather severely mutilated, having lost one of its ovigers and four legs. Its sex is indeterminable, but it is probably immature. The first segment of the trunk is distinct; the others can be traced, but with difficulty. The limbs are much more spinose than in my type; everywhere the tubercular enlargements from which the stiff setæ arise are more abundant, especially on the first coxa and the femur. The oviger also is very different. The first three joints are small, the third having an oblique termination which involves half its length; the fourth is as long as the two preceding, the fifth a trifle longer; the sixth is very short, and the seventh scarcely twice as long. Of the three terminals the middle one is the shortest, the other two being subequal in length. From the sixth each successive joint becomes more slender. The entire appendage is completely devoid of setæ, but on the inner margin of the seventh joint are three curved spines; on the eighth joint there are two, and on the terminal one there are six, one of them occupying the position of the terminal claw. An adult female was taken in 41 fms. (Jan. 30, 1903). The femora contain ripe ova and are swollen in consequence. The setæ are generally finer than those of the male. The oviger, too, resembles that of the male. The denticulate spines are fairly well preserved, and under a high power ($\frac{1}{6}$ " obj.) show a short shaft with three small, but strong, teeth. Then follows a flattened ovoid blade with a minutely toothed margin, the teeth of which are of a totally different character to those on the shaft. On the terminal joint these spines are more curved than elsewhere and the terminal claw does not exist, its place being taken by a much worn example of the denticulate spines. Another occurs more dorsally, but is broken off in this specimen.

I believe I am correct in identifying these specimens with the *P. cornigera* of Professor Möbius and with the *Cordylochele turqueti* of Professor Bouvier. Though I have seen both species, I must admit that I have not examined them with that care that the fact of a second closely allied species having been found demands.

The essential difference between the 'Discovery' and the 'Valdivia' specimens occurs in the length of the legs, which are half as long again in the latter specimens.

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PSEUDOPALLENE AUSTRALIS.

(Plate I., fig. 2.)

Specific characters :—

Body with lateral processes widely separated, these and the cephalon armed with stout spurs.

Limbs armed with rows of prominent tubercles which bear the setæ. Propodus with few setæ dorsally and a proximal group of three or thereabouts.

Oviger ten-jointed, four terminal joints long and cylindrical. Denticulate spines without lateral teeth at base.

Body rather robust, though more slender than in the last-named species; lateral processes widely separated, and but little longer than the trunk is broad. It is smooth except for the spurs on the cephalon and lateral processes. These are similar to but more upright than those of *P. cornigera*. The segmentation is distinct.

The Ocular tubercle is short, stout, rounded at the extremity, and bears four large well-developed eyes. It rises just clear of the first pair of lateral processes.

The Abdomen is of normal proportions, rather ovoid in shape and without setæ. There is no articulation, and it is directed obliquely upwards.

The length of the body is 6mm. and its extreme width is 3mm.

The Proboscis and the Cheliferi are as in the preceding species.

The Ovigers (fig. 2 a) rise just behind the neck, each from a small body-process. The first joint is very small and stout, the second equally stout, but much longer; the third is more slender, and has the usual oblique termination, but is scarcely as long as the two preceding joints; the fourth is nearly as long as the three preceding. The fifth is much the longest of the appendage, slender and rather enlarged distally. The sixth is quite small, about a quarter the length of the fifth. All these joints bear a very few minute setæ, all of which have traces of an enlarged base. The four terminal joints are long and slender, with very little difference in their length; the first is longest, the next two are subequal, and the last the shortest. All are provided with numerous denticulate spines, which occur in a single row (fig. 2 b). They comprise a rather conical shaft, surrounded by a flat leaf-like blade with a finely dentate margin. There is no trace of the stout basal teeth so characteristic of the preceding species. The end of the terminal joint bears two curved spines, which are obviously the same denticulate spines worn down. The character of these four terminal joints differs from those of the preceding species in their more slender and cylindrical form as well as their greater length.

The Legs extend to a length of 23mm. Of the three coxæ the second is quite as long as the other two together; the proportions of the three following joints are as 6:5.5:5.5; the tarsus is very small, the propodus is curved, especially proximally, and rather more than one-third the length of the second tibia. The terminal claw is very long and slender; there are no auxiliaries, nor is there any heel. The setæ, if such they may be called, are small and delicate. They lie in lines parallel to the surface of the joint, and, with very few exceptions, each one occurs on a prominent

tubercular process arched towards the extremity of the limb. They occur distally on the first coxa, dorsally on the second, where there are two rows, and ventrally on the third coxa. Elsewhere there are five rows in which the ventral tubercles are the smallest. Between the two rows on the second coxa distally is a rounded tubercle bearing no seta. The distal extremity of the second tibia is liberally provided with small stout setæ not connected with tubercles; its distal fringe is inconspicuous. The tarsus is covered with setæ which increase in length distally, forming a fringe of long and stout setæ. The tubercular character of the leg completely disappears on this and the succeeding joint. On the propodus there is a scanty supply of minute setæ dorsally, and ventrally at the proximal end of the joint is a well-developed enlargement bearing three spines of moderate strength; the rest of the ventral surface is occupied by a band of small but fairly prominent spinous setæ.

A single specimen of this species was taken off the Barrier, lat. $78^{\circ} 25' 40''$ S., long. $185^{\circ} 39' 6''$ E. in 300fms. Bottom, mud. *Loss Sea.*

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It is an adult female, with the Genital apertures prominent on the second coxæ of all the legs.

PALLENOPSIS.

Body slender or robust, distinctly segmented.

Proboscis cylindrical, ventral in origin, flexibly united to the trunk.

Abdomen long and slender.

Chelifori well developed; scape long, two-jointed.

Palps reduced to a more or less conspicuous knob.

Ovigers ten-jointed, present in both sexes, without a terminal claw or denticulate spines.

Legs with auxiliary claws. A tubular duct occurs in a mid-ventral position on the femora of the male.

Ocular tubercle placed anteriorly on the cephalon, with two unequal pairs of eyes.

As above stated, the generic definition is much altered from the original of Prof. E. B. Wilson (32). Besides the two new species described below, no less than thirteen have from time to time been recorded, all of them from a strictly limited number of specimens. They are separated by characters which, when committed to paper, do not appear as definite as one would like. Nothing is known with regard to the variation which may occur within the limits of "a species," and so it must remain open to question whether I have taken the right course with reference to *P. hiemalis* and *P. pilosa*, Hoek, or not.

PALLENOPSIS GLABRA. ✓

Pallenopsis glabra, Möbius (23), p. 184.

Specific characters :—

Body comparatively slender, with lateral processes widely separated, and with two small tubercles dorsally.

Chelifori well developed, scape two-jointed, the whole limb minutely scabrous.

Palps reduced to a conspicuous stump.

Ovigers ten-jointed, without claw or denticulate spines.

Legs long, covered throughout with minute spinous setæ.

I am unable to find any satisfactory grounds for separating this species from that of Professor Möbius. A full description follows, as that of Professor Möbius is scarcely sufficient on small points. Body comparatively slender, with the lateral processes widely separated and slightly increasing in length to the third, which is directed backwards.

The Cephalon is long, rather broader than the rest of the body, bevelled anteriorly to form a median point, immediately behind which lies the stout ocular tubercle. This is stout, erect, rounded in front, and terminating in a short spine on the posterior half of the tubercle above the eyes. The four eyes are well developed, the anterior pair being much the larger. The Ovigera arise on small body-processes immediately in front, and rather below the level of the first lateral pair.

The Abdomen is very long, slightly curved, and with a clavate extremity; it is not articulated to the trunk, and is directed obliquely upwards at a considerable angle. It is covered with minute curved spines.

The segmentation of the trunk is rendered conspicuous by a slightly raised ridge forming the posterior border of the segment, these ridges are rather more prominent ventrally, and in both cases bear a few minute spines. Similar spines occur on the lateral processes, and form a distal fringe round them.

The Proboscis is movably articulated to the trunk and directed downwards, its origin is ventral, and at the proximal end of the cephalon; it is cylindrical, tapering slightly, its distal extremity rounded and the mouth small. It is completely covered with minute spines except for a narrow band in the mid-ventral line.

The Cheliferi are well developed, and arise close to the middle line, their origin occupying almost the entire width of the cephalon. The scape is two-jointed, and half as long as the trunk measured to the base of the abdomen; the two joints are sub-equal in length, the second being expanded distally. The chela is directed downwards, the palm rather curved, and fully as long as the other joints. The small dactyli are directed inwards, the movable one having a spinous cushion at the base. The entire appendage is covered with minute spines, largest and most numerous on the second joint of the scape, the distal fringe of which is also more conspicuous.

The Palps are stout single-jointed stumps arising from the sides of the cephalon, about the middle of its length.

The Oviger is ten-jointed. The first joint is very short and stout, the second is much longer, clavate and setose on its outer margin; the third is shorter, curved, and having a very oblique termination; it is also setose on its outer margin. These three joints form a curve in one direction, and the following three curve in another. The fourth and fifth joints are comparatively long and sub-equal, both slightly curved, the fourth setose on both sides, the fifth only on its outer margin; the sixth joint is short and much curved, and from this one the remaining joints become shorter, more slender, and more setose, the setæ being longer than elsewhere. There is no terminal claw, nor denticulate spines.

The Legs are long, attaining a length of 69mm. The lateral line is conspicuous, beginning on the lateral processes and extending to the end of the second tibia. Of the three coxæ the second is longer than the other two together, all three are thickly covered with small spinous setæ on the ventral surface, but, except on the first coxa, there are none dorsally. The proportions of the three following joints are as 17 : 14·5 : 21. The femur is fairly well covered with minute setæ ventrally; dorsally they are much less numerous, except at the distal extremity. A linear arrangement of the setæ is observable, but it is not very regular, a distal fringe is not very prominent, and almost confined to the dorsal side. On the first tibia the setæ become more numerous dorsally, they preserve the same general arrangement, but there are longer setæ mixed with them. On the second tibia this becomes much more pronounced, and ventrally the setæ are so numerous that the linear arrangement is completely obscured; the distal fringe on both joints is well developed, more especially so on the ventral side of the second tibia. The tarsus is very small, the ventral surface being double that of the dorsal; the former is covered with long spinous setæ, most prominent distally, like those of the distal fringe of the preceding joint, dorsally they are smaller, but form a well-developed fringe. The propodus is slightly curved, and completely covered with small spinous setæ, and some of these form a distal fringe over the insertion of the terminal claw and its auxiliaries. At the proximal end of the joint is a series of some half-dozen short spines, the centre ones being the largest; beyond these a group of stout spinous setæ extends to the end of the joint. The terminal claw is short, half the length of the propodus, and the auxiliaries are about half its size.

Of the two specimens obtained one is a male, and the Genital apertures occur on a slight swelling at the distal extremity of the second coxæ of the two posterior pairs of legs. On the ventral surface of the femur is a swelling about the middle of its length, and this bears a short but stout duct characteristic of the males of this genus. The Genital apertures of the female occur on a very pronounced swelling, in a similar position to those of the male, but on all the legs.

This specimen is remarkable for having the first leg of the right side complete in all essential details, but not extending beyond the distal extremity of the femur of the normal limb.

Winter Quarters, off Flagon Point. January 17th, 1903. 5-20 fm. Very rough ground. 1907.6.24
9-10

PALLENOPSIS VILLOSA. ✓

*(Plate II., fig. 1.)

Body robust, with lateral processes rather close together. Entire animal clothed with long, slender setæ, giving it a woolly appearance.

Chelifori well developed, scape two-jointed, no setous cushion at the base of the dactylus.

Palps reduced to a knob.

Oviger ten-jointed, without claw or denticulate spines.

Legs densely clothed with fine setæ, propodus with several strong spines ventrally; one or two of the proximal ones are much the largest.

Body robust, with the lateral processes distinctly, but not widely separated. Segmentation is complete, and in the case of the trunk it is rendered very prominent by each segment to some extent overlapping the following one; this is most noticeable ventrally.

The Cephalon is large, with a distinctly constricted neck. At its extreme anterior end, which is straight, the stout rod-like ocular tubercle projects slightly forwards; this is rounded at its extremity, where there are four well-developed eyes, the anterior pair very much larger than the posterior.

The Abdomen is long and distinctly articulated to the trunk; it increases in diameter to a short distance from its extremity, when it abruptly tapers to a blunt point. About its middle it is provided with a considerable number of long slender setæ. Similar setæ fringe the anterior border of the cephalon, the distal extremities of the lateral processes, and the posterior border of each segment. None of these setæ are present ventrally. The length of the body is 10mm., and its width is 6.5mm. The abdomen measures barely 4mm.

The Proboscis is stout, cylindrical, rounded at the extremity, and articulated to the trunk on the ventral surface, and therefore directed downwards. The mouth is small. It is liberally covered with short setæ. In length it is scarcely half that of the body.

The Cheliferi are long and chelate; they arise quite close to the middle line underneath the anterior border of the cephalon. The scape is stout and two-jointed, measuring some 5mm. in length; the two joints are sub-equal and covered with long slender setæ, the second joint more abundantly so, especially distally. These setæ are confined to the dorsal surface; a row exists ventro-laterally, but ventrally they are replaced by very short setæ. The third joint, forming the chela, is directed downwards, and is shorter than the preceding. It is covered all over with setæ, shorter than the average, but varying in length from the proximal to the distal end; on the outside of the movable finger is a dense tuft of long setæ (fig. 1a). The dactyli are turned inwards, the movable one being the longer. They are curved at the tips, which cross over each other, and are devoid of teeth.

The Palps arise at the side of the proboscis, and are nothing more than rounded knobs.

The Ovigera are ten-jointed, and without terminal claw or denticulate spines (fig. 1b). They arise ventro-laterally between the base of the proboscis and the first lateral processes. All the joints are small, and the appendage is curved like an attenuated **S**, and setose throughout. The first joint is small and stout, the remainder gradually decrease in breadth; the second is about twice as long as the first; the third is intermediate between the two, and has a very oblique termination. These three joints bear long setæ on the outside of the curve formed by them. The fourth joint is the longest on the appendage, and slightly curved; it bears a few long setæ on the inner side, and numerous short ones on both. The fifth joint is not so long, also slightly curved and dilated distally with long setæ on its outer side. The sixth joint is shorter and slightly curved; it is thickly clothed with long setæ, and bears a few

on the opposite side distally. The seventh, eighth, and tenth joints are sub-equal in length, and the ninth is a little shorter. The arrangement of the setæ is the same as on the sixth joint, except that the distal group on the outer side increases on each joint, so as to involve the whole of it. The setæ on the five terminal joints are very long and quite simple.

The Legs are very stout, and some 36mm. in length. The first coxæ are about as long as their corresponding lateral processes; the second are longer, and, in the female, bear a conspicuous enlargement ventrally near the distal extremity, upon which the large genital openings occur; these are on all the limbs. The third coxæ are about the same size as the first. The three following joints differ but little in size, being proportionally as 8.5 : 9 : 9.5. The tarsus is very small, and the propodus is about a quarter the length of the second tibia. The entire limb is clothed with setæ. Dorsally the three coxæ each bear a prominent distal fringe of long setæ. The first has two lateral bands in addition, while the other two are more completely clothed. Ventrally the third coxa is partially covered with small setæ, and has a prominent distal fringe of longer ones, the other two only possess a distal fringe of short setæ. On the femur the dorsal surface is covered with long setæ, which also form a prominent distal fringe; the ventral surface bears only small setæ, but on each side there is a band of the large ones just below the well-developed lateral line. This arrangement holds good on the two tibiæ, but the setæ are much more thickly set. At the distal extremity of the second tibia the setæ become spinous ventrally, and as spines form the distal fringe on that side. The ventral surface of the tarsus is clothed with spines which are large distally; dorsally there is a fringe of setæ only. The propodus is covered dorsally with setæ of more moderate length than those on the appendage generally; laterally they are smaller still, and along the ventral aspect there is a row of about a dozen strong spines, a little irregular in size, but one or two of the proximal ones are much the largest. There is no projection of the propodus beyond the insertion of the terminal claw, which is stout and rather more than half the length of the joint that bears it. It is accompanied by two small auxiliaries.

The single specimen is an adult female, and contains ripe ova.

Taken off Coulman Island in 100 fm., on mud and stones, January 13th, 1902.

1907.6.24
11

PALLENOPSIS PILOSA. ✓

(Plate II., fig. 2.)

now = Lodygoni Gordon.

Phorichilidium pilosum, Hoek (14). p. 90.

Pallenopsis pilosa, Hoek (16). p. 9.

Specific characters:—

Body not very robust, with lateral processes not widely but distinctly separated. Body (dorsally) and legs covered with extremely long thin hairs.

Chelifori well developed, scape showing distinct articulation on the dorsal surface. No setose pad at base of dactylus.

Body fairly robust, with lateral processes distinctly, but not widely, separated; two pairs directed forwards and the other two backwards.

Cephalon stout, longer than two segments of the trunk, cylindrical, with its anterior border bevelled on each side; near the point thus produced lies the Ocular tubercle. This is short and stout, capped by a blunt point below which are four well-developed eyes; the anterior pair larger than the posterior pair.

The Abdomen is long and slender, terminating in a blunt point, and bearing numerous long setæ.

The segmentation of the body is perfect, and on the posterior margin of the three anterior segments are two tufts of long slender setæ, a number of which occur also on the lateral processes, and also form the distal fringe. The ventral surface is devoid of setæ.

The length of the body is 10mm., its width 5mm. The abdomen measures 4mm. in length.

The Proboscis is ventral in position, directed downwards and movably articulated to the trunk. It is cylindrical, terminating in a blunt cone; mouth small, covered with small setæ 4mm. long.

The Cheliferi are well developed; they arise close to the middle line in front of the cephalon, and extend considerably beyond the proboscis. The scape is long and single-jointed, though dorsally there is a slight enlargement about the middle of its length, indicating a possibly fused joint. Numerous long and slender setæ are distributed over the scape. Distally the setæ are smaller, and there is a strongly developed distal fringe. The chelæ are comparatively small, and hang vertically. The palm is scarcely more than a quarter the length of the scape, covered with short stiff setæ. The fingers are small, and directed inwards at a considerable angle from the palms; the movable finger is nearly twice the size of the other, but neither bears any trace of teeth.

The Palps are quite rudimentary, being nothing more than a small but conspicuous rounded stump at the side of the proboscis, well behind the ocular tubercle when viewed from the dorsal aspect. They bear a few small setæ.

The Ovigera occupy a lateral position immediately in front of a shallow groove separating the cephalon from the first lateral processes. They are ten-jointed (fig. 2). The first joint is small and stout; the second is about three times as long, enlarged distally; the third is intermediate in length between these two; the fourth is long, about as long as the two preceding joints, and very stout; the fifth is very little longer, slightly narrowed in the centre, and expanded distally; the sixth is stout, and not half the length of the fifth. All these joints bear a few short setæ, most numerous on the outer side of the fifth and sixth joints. The seventh joint is longer than the sixth or the two following together; of these the proximal is shorter, the terminal joint (missing in the appendage examined in detail) is quite small and without a terminal claw. The last four joints bear long and stout setæ of a simple character. There are no denticulate spines.

The Leg attains a length of 32mm. Of the three coxæ the second is about as long as the other two together, and is much enlarged distally. The first bears a mid-dorsal row of a few long setæ and a distal fringe of the same kind. The second bears two dorso-lateral rows and the distal fringe; and ventrally, a conspicuous fringe between the distal extremity and the genital apertures. The third coxa is covered ventrally and laterally with setæ and carries ventrally a very prominent distal fringe. The proportions of the three following joints are 8.5 : 8.5 : 10, these joints are covered with lines of very long slender setæ, their great length making it difficult to determine the precise number of rows. On the femur they are most abundant ventrally, except near the distal extremity. On the two tibiæ the ventral surface is much more scantily supplied. The distal fringe of the second tibia is rather spinous ventrally. The tarsus is very small, setose, and with a few spinous setæ at its ventral extremity. The propodus is curved, covered with rather short setæ, a fringe of longer ones distally; there is no heel. Ventrally at the proximal end of the joint are two or three stout spines, and a band of smaller ones of irregular size extends to the end of the joint. The terminal claw is long and slender, with two well-developed but not large auxiliaries. Small setæ also occur more or less abundantly throughout the limb.

The Genital apertures of the female occur on the enlarged part of the second coxa of every leg. In the male these orifices occur at the apex of a pointed tubercle on the two posterior legs only. The male as a rule is more setose than the female, and on the mid-ventral surface of the femur there is the duct so characteristic of the males of this genus; in this species it is long and slightly twisted, conspicuous even among the long setæ. The joints of the ovigers up to the sixth joint are more strongly developed, longer, and all are more setose than those of the female. One specimen has three perfect ovigers, two on one side being in contact with one another. The eggs are rather large, and held round each oviger in a single rounded mass.

Several specimens of this species were taken off the Ice Barrier in the Ross Sea, 300fm., mud bottom. I am unable to find any satisfactory reason for separating them from the species of Dr. P. P. C. Hock. They are smaller, and the only character which can be used to separate them is the comparative length of the four terminal joints of the oviger, but this does not seem to me to be sufficient.

1907.6.24
12-16

PALLENOPSIS HIEMALIS. ✓

(Plate I., fig. 4; Plate II., fig. 3.)

Body well built, with lateral processes widely separated, but of variable length, and having a tubercular swelling at the dorsal extremity.

Chelifori and abdomen both proportionally long.

Palps, a rather long stump.

Legs clothed with short, stiff setæ.

Body well built, with the lateral processes rather widely separated, as long as the trunk is broad, and each bearing distally a stout tubercle of no great elevation.

The Cephalon is elongated, but not much enlarged in diameter, with a very slightly constricted neck between the first pair of lateral processes and the small body-processes from which the ovigers arise, and which are plainly visible dorsally. The anterior margin of the cephalon is angular, and the Ocular tubercle arises at its front. This is stout, directed very slightly forwards, and terminates in a point above the four well-developed eyes; the anterior pair are larger than the posterior.

The Abdomen is long, not articulated to the trunk, and slightly enlarged before it terminates in a blunt point; it is directed upwards to a moderate extent. The length of the body is 11mm., its width 4.75mm., and the length of the abdomen is 3.75mm. A few small, stiff setæ occur dorsally at the posterior margin of the segments and at the extremity of the lateral processes.

The Proboscis is stout, cylindrical, rounded at the extremity; the mouth is small. Ventrally it measures 4mm. in length and, except in the mid-ventral line, it is closely covered with small, stiff setæ. It is ventral in position, directed obliquely downwards, and articulated to the trunk.

The Chelifori are well developed, and arise close together above and in front of the proboscis. The scape is long and stout, projecting beyond the extremity of the proboscis, though only 4mm. long. It is divided by a distinct joint into two sub-equal portions and covered completely with short, stiff setæ; the second joint is expanded distally and has an oblique termination. The chela is well developed, the palm being rather shorter than the joints of the scape, but like them densely setose. The dactyli are set on its inner extremity and lie transversely. They are short and stout, smooth without teeth; the movable one is the larger, and has a setose pad at the base.

The Palps are stout, single-jointed, rather long stumps; they arise from the sides of the cephalon about the middle of its length.

The Ovigers are ten-jointed, without terminal claw or denticulate spines (fig. 4a). The appendage arises on a small process of the body in front of the first lateral process. The first joint is short and very stout; the second is at least twice as long, slender proximally, much dilated distally; the third is shorter, and the oblique articulation of this joint with the next renders the fourth to all intents and purposes lateral; the fourth is the longest of the appendage and stout; the fifth shorter, and the sixth shorter still. The limb is curved in the form of an **S**, the first three joints forming the curve in one direction, the three following curve in another. Of the four terminal joints the seventh is short, the eighth is longer, the ninth and tenth progressively shorten. The entire appendage is setose, the setæ are small and rather sparse proximally, becoming more numerous to the fifth joint; from that joint onward they are longer, but quite simple, and more completely clothe the joints.

The Legs extend to about 38mm. Of the three coxæ the second is fully twice as long as the other two together, and bears a low rounded tubercle dorsally, just beyond the middle of its length. The first coxa carries dorsally a stout but short tubercular process, similar to, but smaller than, that of the lateral process. The proportions of

the three following joints are 9 : 8.5 : 11.5. The tarsus is very small, and of the normal shape. The propodus is one-third the length of the femur, very slightly eurved. At the ventral side of the extremity is a stout claw, with two well-developed auxiliaries; the heel does not project beyond the insertion of these elaws. The joint is uniformly clothed with short spinous setæ, and there is dorsally a projecting fringe. Ventrally there is a row of stout spines, of which some half-dozen, not very regular in their position, are very prominent (fig. 3). The entire limb is uniformly and densely clothed with very short, stiff setæ, and these, as is usually the case, are more numerous and longer on the second tibia; the distal fringe on this latter joint is prominent, with at least one stout spine ventrally. The ventral setæ on the tarsus are also spinous, one being particularly large. The lateral line is very prominent from the lateral proecesses to the tarsus, both inclusive.

The specimen is a female and bears Genital apertures on a swelling of the second coxa of every leg.

Winter Quarters, inside the 20-fm. line.

A specimen was taken off Cape Wadworth, Coulman Island, which, notwithstanding certain important differences, I cannot regard as being specifically distinct. It is a male, and rather larger than the type. The obvious differences lie in the much greater length of the lateral proecesses and the character of the ventral spines on the propodus (fig. 3a). With regard to the first of these features, the third lateral proecess of the right side is but little more than half the length of the others; the first coxa, the only joint of that appendage that exists, is also abnormally small, though there are no definite traces of injury. The other feature rests on the armature of the propodus. The ventral surface of this joint bears proximally three very stout spines, and from there to the extremity is a band of spinous setæ.

The length of the body is 12mm., of the trunk only 9mm., and its extreme width is 6mm., rather larger, especially in the last measurement, than the type. The chelifori (seape) and the abdomen are a little shorter. The oviger differs only in being much stronger; the setæ are more numerous and also stronger. The fifth joint is however longer, nearly equalling the fourth. This is a not uncommon sexual difference. The lateral proecesses and the first coxa exhibit in a less degree the tubercular proecesses of the type.

The proportions of the three principle joints of the legs are 9.75 : 8.5, and 12, a difference of no importanee. These limbs are setose throughout, though the setæ are rather defieient proximally, becoming much more abundant on the tibia. Ventrally they are very small, stiff, and crowded; dorsally much less numerous. They have among them a number of much longer and more slender setæ. The tarsus is coarsely setose ventrally, with one very prominent spine. The distal fringes of the joints are not strongly developed; that of the second tibia is chiefly ventral and spinous. The lateral line is very distinct from the lateral process to the end of the second tibia. The femur is swollen ventrally near the middle, and bears a very short but stout tubular duct.

1907.6.24
17-19

Another specimen, a[✓] male, was taken in Winter Quarters, inside the 20-fm. line before the ship was frozen in. It is in a severely mutilated condition, having lost the posterior segment of the trunk and several legs. It differs slightly from the male above described, the lateral processes being a little closer together and the body, especially the cephalic portion, being a trifle stouter, and the tubercular knobs on the lateral processes not being so distinct, but all these features can, I think, be readily accounted for by age.

This species is closely allied to *P. patagonica*, Hoek.

NYMPHON.

This genus is perhaps the most widely distributed and best known of all the genera of Pycnogonida. It is readily distinguished from all others by the well-developed chelifori, the five-jointed palps, and the ten-jointed ovigers, the four terminal joints of these being provided with a single row of denticulate spines. The form of the body varies greatly within certain limits, and Professor Sars (25) has subdivided the genus into three :—

Nymphon retains the more slender and comparatively long-legged species.

Chætonymphon the more robust and short-legged species, which also, as a rule, are more setose on the body than those of the original genus, *Nymphon*.

Boreonymphon, another robust form, readily separable from the others by the absence of teeth on the chelæ, the spines of the ovigers being simple and not denticulate.

The species brought back by the 'Discovery' are eight in number; four are assigned to the original genus, though one of these, *N. adureanum*, bears a few simple spines on the oviger instead of the rows of denticulate spines. The other four, of which one, for the present at least, is regarded as a southern variety of a previously described species, are assigned to the genus *Chætonymphon*.

NYMPHON HIEMALE. ✓

(Plate III., fig. 1; Plate X., fig. 8.)

Specific characters :—

Body slender, with rather long lateral processes very widely separated. Limbs covered with very minute setæ.

Ocular tubercle stout and short.

Palps five-jointed, proportions of last three as 7 : 4 : 5·5.

Oviger ten-jointed, denticulate spines rather numerous, with eight to ten teeth on each side.

Legs long, scabrous, terminal claw with well-developed auxiliaries.

Body smooth, slender, with rather long lateral processes, which are very widely separated; the first of these is curved forwards. The segments are very strongly marked immediately behind the lateral processes.

The Cephalon is long, the greater part of its length is taken up by a slender

neck; anteriorly it is much expanded, the two lobes being separated by a small but conspicuous groove.

The Ocular tubercle is situated immediately in front of the first lateral processes; it is comparatively stout, short, truncate, and bears four well-developed eyes without any pigment.

The Abdomen is small, ovoid, does not project beyond the last pair of lateral processes, and is not articulated to the trunk. The length of the body is 7.5mm. and its width is almost 4mm.

The Proboscis is cylindrical, smooth, and directed obliquely downwards; it is about 3mm. in length.

The Chelifori are well developed. The scape is as long as the proboscis, slightly curved and sparsely covered with minute setæ; the distal fringe is not conspicuous. The chelæ are also curved, half their length being taken up by the palm, which is finely setose, the setæ extending on to the base of the immovable finger. The fingers are slender, much incurved at the tip. The teeth are numerous and regular in size, not so closely set in the immovable finger as in the other.

The Palp is slender, five-jointed, and rises at the side of the proboscis below the chelifori (fig. 1a). The first joint, as usual, is very small; the second is the longest of the appendage, slightly swollen distally, and sparingly covered with minute setæ. The third joint is but a little shorter, rather stouter, and more liberally supplied with short setæ, though these are still scanty. The fourth joint is scarcely half as long as the second, very richly supplied with short setæ on its ventral margin, much more sparingly dorsally. These three joints have a well-defined distal fringe. The terminal joint is nearly half as long again as the preceding and, like it, richly clothed with short setæ ventrally, more sparingly dorsally.

The Oviger is ten-jointed, and arises ventro-laterally in front of the first lateral process on a prominent body-process, the position of which is clearly seen from the dorsal surface (fig. 1b). The first three joints are small and stout, the third curved and having a very oblique termination; only a distal fringe of very small setæ can be detected on these joints. The fourth joint is very long, slightly curved, with very few minute setæ besides the distal fringe. The fifth joint is much the longest of the appendage, and is thinly covered with very small setæ, with a more strongly marked distal fringe. The sixth joint is little more than half as long as the preceding, slightly curved, and thickly clothed with small stiff setæ on its outer side and a well-developed distal fringe. The four terminal joints are long, progressively decreasing in length, but the last two are sub-equal. All are more or less well supplied with short stiff setæ dorsally and a distal fringe of rather longer setæ. The terminal claw is long and slender, with about fourteen curved teeth. The denticulate spines are long, and in the specimen critically examined occur 13 : 10 : 10 : 9 on the various joints. (Plate X., fig. 8.) The shaft is flattened and slender, and carries eight to ten teeth on each side; the third or fourth

from the base is the largest, the remainder tapering off to very minute proportions. The eggs are small and the spherical mass is packed round the proximal part of the fifth joint.

The Legs are long and slender and attain a length of about 45mm. The second leg of the right side has in this case been selected for measurement. Of the coxæ the first and third are sub-equal, the second being quite as long as the other two together. The proportions of the three following joints are as 10 : 11 : 16, and the tarsus and propodus taken together are 4·5, the former joint being a little the longer of the two. A lateral line is plainly visible on the femur and to the end of the leg. On the femur such setæ as exist are extremely minute; on the second tibia they are very numerous but small, arranged principally dorsally and ventrally, with a distinct distal fringe. On the tarsus and propodus the arrangement is the same, but the setæ are even more crowded. Ventrally on the propodus is a row of about a dozen comparatively strong spines, more distally than proximally. There is a distinct heel fringed with rather long setæ. The terminal claw is stout and accompanied by two auxiliaries about one-third its size.

The Genital apertures of the male are found on the second coxæ of the two posterior legs, those of the female being found on all the legs.

1907.6.24
20-24

A number of specimens were taken in Winter Quarters in 125 fm.

NYMPHON LANARE. ✓

(Plate III., fig. 2; Plate X., fig. 9.)

Specific characters :—

Body very slender, with lateral processes long and widely separated.

Ocular tubercle short and stout.

Palps five-jointed, proportions of last three 10 : 9 : 11.

Oviger ten-jointed, denticulate spines, about double the number on the first joint as on any of the others, with five to seven teeth on each side.

Legs long and slender, with long and fine setæ, terminal claw long, without auxiliaries.

Body very slender, with lateral processes long and very widely separated.

The Cephalon is long, expanded anteriorly into two lobes separated by a narrow groove. The neck is elongated, and at its base, ventrally, are small body-processes for the attachment of the ovigers, visible from the dorsal aspect.

The Ocular tubercle is short, stout, and truncated; it lies immediately in front, but not quite clear of the first pair of lateral processes. It bears four well-developed eyes.

The Abdomen is quite small, and does not extend as far as the posterior lateral processes. It is directed slightly upwards, and not articulated to the trunk. The length of the body is 8·5mm., and its width 5mm.

The Proboscis is cylindrical, slightly swollen in the middle, its extremity being rather angular. Together with the body, it is quite devoid of setæ.

The Chelifori are well developed, long and slender. The scape is single-jointed, longer than the proboscis, but scarcely as long as the chela. It bears but few setæ,

except a distal fringe of long and slender ones. The palm of the chela occupies about half its length, and bears a number of fine setæ dorsally. The fingers are long, slender, incurved at the tips, and provided with numerous slender teeth, irregular in size and not very closely set.

The Palp arises laterally at the side of the proboscis (fig. 2a), and comprises the normal five joints, all of which, except the first, are very long and slender, the proportions being 10 : 10 : 9 : 11. Setæ are non-existent on the first two joints; on the third scanty, most numerous on the terminal joint, but not very thickly distributed there; they are small, rather delicate, and occur mainly on the outer side of the limb.

The Oviger has the normal ten joints, and arises on a small ventro-lateral body-process just in front of the first pair of lateral processes (fig. 2b). The first three joints are small, but progressively lengthen, the third having the usual oblique termination. The fourth joint is long, the fifth longer, and the sixth still long, though the shortest of these three, the proportions being about 7 : 8 : 5. The sixth joint is rather thinly covered with small setæ on its outer side, and has a well-developed distal fringe. The preceding joints have so few minute setæ between them that they are scarcely noticeable. Of the four terminal joints, the first is about twice the length of the next; the other three differ very little in size, but the middle one is the smallest. All are provided with a few small setæ and distal fringes. The terminal claw bears a dozen slender teeth rather closely set. The denticulate spines form a single row (plate X., fig. 9). They consist of a stout shaft, which begins to taper at about a quarter of its length, where the denticulations begin. Of these there are from five to seven; the first is small, the next three large, and the remainder more or less vestigial. Of these spines there are 10 : 5 : 4 : 5 respectively on the various joints.

The Legs are long and slender, attaining a length of nearly 45mm. The three coxæ are long, the second being longer than the other two together; these joints are rather scantily clothed with setæ of no great length. The proportions of the following joints are 8·5 : 9·5 : 12 : 4 : 3. The terminal claw is very long and slender, more than half the length of the propodus, and there are no auxiliaries. The limb is clothed with setæ, not very closely set, in a linear manner. On the femur and tibia they are very long and slender, becoming reduced in size on the tarsus, while on the propodus they are very small.

Two examples of this species were taken off the Barrier in 300fm., bottom mud, 27th January, 1902.

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NYMPHON ADAREANUM. ✓

(Plate III., fig. 3.)

Specific characters :—

Body smooth and slender, with lateral processes widely separated.

Ocular tubercle short, rounded.

Palps five-jointed, proportions of last three 2·5 : 1·25 : 1·75.

Oviger ten-jointed, without denticulate spines, but with very few simple curved spines.

Legs of moderate length, with rather long setæ, terminal claw with two well-developed auxiliaries.

This small species has a fairly well-built body, with the lateral processes rather widely separated, and as long as the diameter of the trunk. The trunk articulations are very distinct, and immediately behind the lateral processes. No setæ of any kind are to be seen on the body.

The Cephalon is stout but not widely expanded, showing two distinct lobes for the reception of the chelifori; it is not quite as long as the second and third trunk segments together.

The Ocular tubercle is very stout, of small elevation, rounded at the summit, and carries four well-developed eyes. It lies just in front of the first pair of lateral processes and behind the neck.

The Abdomen is of moderate dimensions, curved upwards, and not separated by an articulation from the trunk.

The length of the body is 2.75mm., and its extreme width 1.5mm.

The Proboscis arises on the ventral side of the trunk, and measured ventrally it is nearly one-third the length of the entire body. It is stout, gently tapering to a rounded extremity, quite smooth.

The Chelifori are well developed; the scape is single-jointed, extending beyond the proboscis; provided laterally with comparatively long setæ. The chela is not very long, the palm and fingers occupying approximately equal halves; the former is covered with setæ, and the fingers, rather curved, are supplied with a very moderate number of slender teeth rather widely separated.

The Palp is five-jointed, and rises underneath the chelifori (fig. 3a); as usual, the first joint is very small and the second long. Owing to distortion in mounting this appendage, the comparative length of the second and third joints cannot be very accurately stated, but the second appears to be twice the length of the third; the fourth is half the length of the third, and the fifth is longer than the preceding, the proportions being 5 : 2.5 : 1.25 : 1.75. The terminal joint is ovoid, and fairly well supplied with comparatively long setæ; the three preceding joints have well-developed distal fringes and a small number of setæ scattered along the shaft; these are most numerous on the third joint.

The Oviger is ten-jointed, and rises from a small process of the trunk, visible dorsally, just in front of the first pair of lateral processes (fig. 3b). The first three joints are very small; the second and third are subequal in length, the latter much the more slender; the fourth is longer than the three preceding ones together; the fifth is twice as long, much curved, and bears a few setæ on its outer margin; the sixth is half as long as the fourth. The four terminal joints are very small, the first being the largest, and all bear two or three long setæ distally. The terminal claw is long and slender, with five slender teeth set at irregular intervals. Of denticulate spines, such as characterise the genus *Nymphon*, there are none, but of special spines there are 2 : 2 : 2 : 1 on the four joints; these are curved blades without any other distinguishing feature.

The Legs are not very long, extending to nearly 11mm. from the trunk. Of the three coxæ, the second is as long as the other two together, the first being by a little the smallest; the proportions of the remaining joints being 4 : 5 : 6 : 0.75 : 2. The terminal claw is large and stout, with two well-developed auxiliaries. The lateral line is distinct throughout. The setæ have a rather indistinct linear arrangement, those on the sides of the coxæ are prominent, especially on the second; on the third they are more confined to the ventral surface, and the distal fringe is fairly well developed. On the femur the setæ are long and straggling, chiefly lateral, and ventrally there is a row of small tubercles. On the two tibiæ, but more especially the second, the setæ are most abundant, largest on the first. Ventrally they are much smaller, the distal fringe of the second tibia becoming spinous. The tarsus is a very short joint with long setæ dorsally, smaller and more numerous ones ventrally, which become delicate spines distally. The propodus is covered with setæ dorsally, and ventrally there is a row of rather strong spines, and of these the middle ones are strongest.

The single specimen is a male, carrying young, apparently just hatched. The Genital apertures are to be found on the second coxæ of the two posterior pairs of legs.

From the root of a Laminarian taken in 17 fm., Cape Adare, 24th February, 1904.

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NYMPHON FRIGIDUM. ✓

(Plate III., fig. 4; Plate X., fig. 10.)

Specific characters :—

Body very slender, with lateral processes long and very widely separated.

Ocular tubercle very short, stout.

Palps five-jointed, proportions of last three 3 : 1.5 : 3.

Oviger ten-jointed, denticulate spines not very numerous, with five to seven lateral teeth.

Legs long and slender, propodus with ventral row of spines, a large terminal claw and two auxiliaries.

Body well built, perfectly smooth, with the lateral processes widely separated and rather long, much more slender than the trunk.

The Cephalon is rather long, with a distinct neck and expanded anteriorly into the two normal lobes.

The Abdomen is short, directed obliquely upwards, and not projecting beyond the posterior pair of lateral processes.

The Ocular tubercle is stout, very short, and bears four well-developed eyes.

The length of the body is 2mm., and its extreme width is 1.2mm.

The Proboscis is cylindrical, directed downwards.

The Cheliferi comprise a single-jointed scape, slender, and covered with a small number of fine setæ. The chelæ are well developed, the palms being about half their length, and setose; the fingers are not much curved, provided with a number of teeth, not very closely set, and of uniform size.

The Palp is five-jointed and rises underneath the cheliferi (fig. 4a). The first

joint is small, and the proportions of the remainder are 4 : 3 : 1.5 : 3. The terminal joint is well supplied with setæ on the outer side, and the preceding one is similarly, but less well, provided. Elsewhere they are scanty, a few on the third, and only an occasional one on the second.

The Ovipiger is ten-jointed, and rises from a small process immediately in front of the first pair of lateral processes (fig. 4b.) The first joint is very small, the two following are longer and subequal, the third having as usual a very oblique termination. The fourth and fifth joints are subequal, and each much longer than the first three together; the sixth is half as long as the preceding. Of the four terminal joints the first is the longest, the rest differ but little, but the last is longer than the others, and bears a terminal claw with some half-dozen teeth. A limited number of setæ occur on all the joints from the end of the fourth. The denticulate spines are not very numerous, 8 : 5 : 4 : 5, and consist of a slender tapering shaft with from five to seven lateral teeth; the second from the base is strongly developed, the rest graduated to nothing (plate X., fig. 10).

The Legs are long and very slender; they are about .9mm. long. Of the three coxæ the second is longer than the other two together, the proportions of the remaining joints being 4 : 4.5 : 7 : 1 : 1.5. The terminal claw is more than half as long as the propodus, and is accompanied by two slender auxiliaries. The entire limb is rather thinly clad with setæ, which, as usual, are most abundant on the second tibia. The propodus bears ventrally a row of comparatively strong spines, not very regular, the middle ones being generally best developed.

This is not a mature form, and the sexual apertures cannot be distinguished. I am unable to identify it with *Nymphon hiemale*, though it occurs in the same locality, and feel compelled to regard it as an independent species.

CHÆTONYMPHON VILLOSUM. ✓

(Plate IV., fig. 1; Plate X., fig. 11.)

Specific characters:—

Body robust and with the appendages covered with long and fine setæ; lateral processes close together.

Ocular tubercle rather tall, with four eyes at summit.

Palp five-jointed, proportion of last three 6 : 2 : 3.

Ovipiger ten-jointed, denticulate spines not numerous, having five to seven lateral teeth on each side.

Legs short, with a strong terminal claw and two well-developed auxiliaries.

Body very robust and, with the appendages, covered with long and fine setæ. The lateral processes are close together, and these, being stout, give the body a compact ovoid form.

The Cephalon is short, much expanded, and the neck, which thereby becomes distinct, is scarcely a real constriction, the expanded portion being divided into two distinct lobes, bearing a few long setæ distally. Similar setæ occur dorsally on

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each segment of the trunk and on the lateral processes, in addition to the distal fringe. There are none ventrally.

The Ocular tubercle rises from the neck immediately in front of the first pair of lateral processes; it is moderately tall, cylindrical, and bears at its rounded summit four well-developed eyes.

The Abdomen is long and slightly ovate; it projects beyond the first coxæ of the posterior pair of legs in their normal position, and bears a few small setæ.

The length of the body is 6.5mm. and its width is scarcely 4mm.

The Proboscis is stout, cylindrical, and inclined downwards; it is quite devoid of setæ of any kind, and 2.5mm. long, measured dorsally.

The Cheliferi are strongly developed; the scape is stout and single-jointed; it bears on its inner margin a band of long setæ and a distal fringe of similar setæ, but these are much reduced in size on the outer side. The chela is strong, the palm is setose all over and well on to the base of the immovable finger. These setæ are of normal size. The fingers are inclined at a considerable angle with the palm, and are curved at the tips, especially the immovable one. Both are provided with numerous slender teeth, not very closely set, and variable in size; these teeth may be said to be large and small, but they are not disposed with any regularity.

The Palp has the normal five joints and arises at the side of the proboscis (fig. 1a). The first joint is very short and stout; the second is the longest; this is stout, dilated, curved at its distal extremity, sparsely covered with long setæ and much more abundantly with fine ones. The third joint is nearly as long, as 8 to 10, and more abundantly supplied with both kinds of setæ, which occur throughout the appendage. The fourth joint is short and richly setose; the fifth is about half as long again as the fourth, and also richly setose.

The Ovigera arise ventro-laterally, immediately in front of the first pair of lateral processes (fig. 1b). Of the orthodox ten joints the first three are quite small, the last being slightly curved, longer than either of the other two, and with an oblique termination. The fourth joint is long, the fifth is longer still, the sixth about half the length of the preceding. All these joints are covered with very fine setæ; on the first four there is an occasional longer and coarser seta, and on the fifth joint these are more conspicuous on the outer margin and distal extremity; on the sixth joint they cover it on the outer side and form a well-developed distal fringe. Of the four terminal joints the first three progressively shorten without any conspicuous difference in size; the terminal one is a little longer than the preceding, and bears a slender curved and dentate claw half as long again; there are eleven slender teeth on the claw. The denticulate spines are not numerous on these joints, 5:4:3:4, and are of the normal type, the shaft bearing five to seven lateral teeth. The spines on the proximal joint are the largest. (Plate X., fig. 11.)

The Legs are short and robust, only attaining a length of 17mm. Of the three coxæ the second is a little the largest; they all bear a few long setæ dorso-laterally, the

third coxa being the most deficient in this respect. The distal fringe is well developed ventrally on the second coxa, but more so on the third, and the ventral surface of this joint is covered with small setæ. The femur is short and stout, approximately equal in size to the second tibia, the first being a little longer. The setæ on these three joints are arranged in a thoroughly characteristic manner. There are two dorso-lateral rows and a lateral row, all of long, slender setæ. There is also a ventral row of comparatively short setæ, five rows in all. The setæ are much better developed on the second tibia than elsewhere. The distal fringes on these joints are normally developed; on the tibiæ they are ventral and spinous, more especially on the second tibia. The tarsus and propodus are short and much more slender than the rest of the limb. The two joints differ but little in size, the propodus being a little the longer. This bears a stout terminal claw and two well-developed auxiliaries. The setæ of these two joints are small, but have the same arrangement as on the other joints. The ventral row is, however, distinctly spinous, and a very prominent spine exists at the ventral end of the tarsus.

Only one individual of this species was taken, and its sex has not been determined. Coulman Island, 13 January, 1902; 100 fathoms, stony bottom.

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CHÆTONYMPHON BIARTICULATUM. ✓

(Plate IV., fig. 2; Plate X., fig. 12.)

Specific characters:—

Body stout, tapering posteriorly, articulation deficient, lateral processes separated by variable intervals.

Ocular tubercle long and slender.

Palps five-jointed, proportions of last three as 3 : 1 : 1.

Oviger ten-jointed, denticulate spines not numerous, and with not more than five small teeth on each side.

Legs of moderate length, covered with rather fine setæ, terminal claw with small auxiliaries.

Body is stout and tapering posteriorly, with the lateral processes separated by a moderate interval, except the last two pairs, which are quite close together, the articulation between them being deficient. The distal extremities of the lateral processes are provided with slender spines, but these have enlarged bases and thereby become more prominent.

The Cephalon is short and stout, a very distinctly constricted neck separating the expanded portion, which forms two diverging lobes.

The Ocular tubercle lies immediately behind the neck and in front of the first pair of lateral processes. It is tall, slender, cylindrical, and bears four well-developed eyes at the extremity; there is no pigment.

The Abdomen is rather long, narrow, tapering to a blunt point, and not separated from the trunk by an articulation.

The entire body is covered with very fine setæ, not easy to distinguish, and in addition there are two long setæ dorsally near the posterior border of each segment,

two on each of the cephalic lobes, and one in the middle of each lateral process; these also possess dorsally a distal fringe of stout setæ with enlarged bases. The ventral surface appears to be quite devoid of setæ.

The length of the body is 9mm. and its width scarcely 5mm. The length of the trunk only (to base of abdomen) is 6mm.

The Proboscis is stout, cylindrical, and has a length, measured dorsally, of 3mm. It is covered with very fine but comparatively long setæ.

The Cheliferi are well developed. The scape is single-jointed, reaching beyond the proboscis; it is stout and provided with rows of setæ having very stout bases and a few others as if misplaced. The distal fringe is very prominent, especially on the inner side. The chela approximately divides its length between the palm and the fingers; the former is covered with short and comparatively fine setæ, and these are continued well on to the base of the immovable finger. The fingers are inclined inwards, slender, much incurved at the tips, and furnished with a number of slender, closely-set teeth of fairly regular size.

The Palp arises laterally immediately below the cheliferi (fig. 2a). The first joint is small and stout, the second is long, and extends nearly to the end of the proboscis; the third is shorter; the two terminal ones subequal and together shorter than the third, the proportions of the four joints being 5 : 3 : 1 : 1. The second joint is uniformly covered with fine setæ, as are the others. The setæ become more numerous and both longer and stiffer towards the extremity of the appendage.

The Ovipositor rises ventro-laterally immediately in front of the first lateral process; it consists of the normal ten joints, and is covered throughout with very fine delicate setæ (fig. 2b). Other and stiffer setæ occur sparingly on the fifth joint, more numerous on the sixth and the distal fringes of most of the joints, particularly the terminal ones. The first three joints are small, but progressively lengthen, the third having a very oblique termination. The fourth is a trifle longer than the first three together, the fifth is longer still, and the sixth is half the length of the fifth. The four terminal joints progressively shorten, the third being practically half the length of the first; the terminal one bears a slender curved claw, as long as itself, with nine slender teeth. The denticulate spines are not numerous, 7 : 5 : 4 : 4 (Plate X., fig. 12). They consist of a flattened tapering shaft with not more than five lateral teeth on each side, none of them large, and occurring nearer the base than usual, leaving the terminal portion of the shaft free. They do not appear to be much worn.

The Legs are not very long, extending to about 25mm. Most of the joints are very stout, but the tarsus and propodus are considerably reduced in diameter. Of the three coxæ the second is the largest, but not so long as the other two together; the proportions of the remaining joints are 5.5 : 6 : 5.5 : 3 : 2. The entire limb is clothed with fine setæ, but in addition to these are conspicuous rows of spinous setæ arising from enlarged bases. Two dorso-lateral rows occur on the first two coxæ, two rows occur dorsally on the femur, but here the spines are small; the two lateral rows are

much larger; but ventrally, this joint and the coxæ also are covered with normal setæ. These spines are best developed on the first tibia, two dorsal and two lateral rows being conspicuous, a ventral row of much finer spines occurs. On the second tibia all these five rows occur, but the spines are rather finer. The setæ of the two terminal joints are small without the enlarged bases, but arranged in the same manner. The terminal claw is long and slender, and is accompanied by two quite small auxiliaries. The distal fringes of the various joints do not present any unusual features.

The single specimen is a female, the Genital apertures are conspicuous on the second coxæ of all the legs.

1907.6.24 Off the Barrier. January 27, 1902. 300 fms. Mud.

30 Lat. $78^{\circ} 25' 40''$ S., long. $185^{\circ} 39' 6''$ E.

CHÆTONYMPHON MENDOSUM. ✓

(Plate IV., fig. 3; Plate X., fig. 13.)

Specific characters:—

Body robust and tapering, articulation imperfect, lateral processes not widely separated, and with stout spines distally and dorsally; no fine setæ whatever.

Ocular tubercle short and stout.

Palp five-jointed, proportions of last three 5.5 : 1.5 : 1.6.

Oviger ten-jointed, denticulate spines few, with four teeth on each side, two of them prominent.

Legs with five rows of spinous setæ, without enlarged bases; terminal claw with two small auxiliaries.

This species is very closely allied to the last, but is much smaller, and presents other differences which are usually regarded as of specific rank.

The Body is robust and slightly tapering, with stoutly developed lateral processes, the intervals between which are variable, widest but not very wide between the first and second pairs; the third and fourth being quite close together, the articulation between the two posterior pairs is not present.

The Cephalon is short, anteriorly expanded into two diverging lobes; the neck is distinct, but very little constricted.

The Ocular tubercle lies behind the neck, but not clear of the first pair of lateral processes.

The Abdomen is horizontal, long, extending considerably beyond the first coxa, ovoid, tapering to a blunt point; it completely fills the space between the two posterior lateral processes. All this is in close agreement with the preceding species. The differences are:—The complete absence of fine setæ from the entire body; the ocular tubercle is rather short, stout, and slightly inclined forwards, carrying four well-developed eyes with pigment on its rounded summit; the lateral processes all provided with two or three stout spines dorsally and distally; the spinous setæ of the legs, while having the same arrangement as in the preceding species, are, on the whole, stronger in themselves, but without the enlarged bases.

The length of the body is 6.5mm., and its width just exceeds 3mm.

The Proboscis is of moderate length, 2mm., measured dorsally, cylindrical but slightly swollen in the middle; it is directed downwards, and not setose at all.

The Chelifori are well developed; the scape is single-jointed, stout, and scarcely as long as the proboscis. A row of stout spines runs along its inner border, and a few spinous setæ constitute a distal fringe, and there are two or three scattered on the shaft. The chela is strong, the palm taking up half its length, and the fingers are set at a considerable angle. The palm is covered, but not thickly, with setæ. The fingers are slender, curved towards the tip, and provided with slender teeth of fairly uniform length, but not very closely set.

The Palp rises laterally, quite close to the proboscis, and consists of the normal five joints (fig. 3a). The first is short and stout, the second is the longest of the appendage and provided with a few long setæ; its proportion to the remainder is $9 : 5.5 : 1.5 : 1.6$; the third is scantily supplied with setæ, the two terminal joints are rather more abundantly supplied; the last joint is ovoid instead of cylindrical.

The Ovigera arise ventro-laterally immediately in front of the first pair of lateral processes. They comprise ten joints of normal character (fig. 3b). The first three joints are quite short, stout, and progressively lengthening; the proportions of the three following are $7 : 9 : 5$. Setæ become prominent, but not numerous, on the fifth and sixth joints; on the preceding joints they are almost non-existent. The four terminal joints are small, the proportions being about $4.5 : 3 : 2.5 : 2.75$, the last one possessing a curved terminal claw, quite as long as the joint, with half-a-dozen rather widely separated teeth. All the terminal joints carry a few setæ distally and dorsally. The denticulate spines are not numerous, $5 : 4 : 3 : 4$ respectively; they consist of the normal flattened blade with two prominent teeth on each side, and two others of which traces remain. They are rather worn. (Plate X., fig 13.)

The Legs are rather short, about 16mm., very stout, but the tarsus and propodus are very much reduced in diameter. Of the three coxæ the second is much the longest, but not so long as the other two together. The first is provided dorso-laterally with two stout spines, and there is another rather smaller one laterally, on the posterior side. A row of spinous setæ occur laterally on the other two coxæ. The distal fringes of these two joints are ventral and inconspicuous; that of the third coxa is the best developed, and on this joint there are several small setæ ventrally in addition. The three following joints are subequal in size, the tarsus and propodus together are three-quarters the length of the preceding joint, and are themselves subequal. In these particulars this species is not in agreement with the preceding. On the two tibiæ there are two dorsal rows of stout spinous setæ, a lateral row on either side, and a strongly developed ventral row. On the second tibia the distal fringe is strongly developed ventrally, and spinous. The setæ on the femur are smaller, and only the two dorsal rows are distinct; the other three rows are present, but very feebly developed; there is a prominent distal fringe dorsally. The tarsus and propodus are similarly provided, but the setæ are much smaller. The terminal claw

is stout, not half the length of the joint that bears it, and provided with two small auxiliaries.

The specimen described above is an adult female with Genital apertures on the second coxæ of all the legs. Nearly mature ova can be seen in the femora.

It was taken in Winter Quarters, in 125 fm., 24 April, 1903. Bottom : small stones, organic débris, polyzoa, shells, etc. Other specimens, generally smaller, were taken at the same place on various dates, and also at other points three and nine miles away, and at the same or greater depths, 180 fm. They all appear to be sexually mature, and differ in a varying degree from the type in their spinose character. In all cases this is more conspicuous in the males. The Genital apertures of the male are on the two posterior pairs of legs only.

The numerous minor features which separate this species from the preceding cannot, in my opinion, be ascribed to age. The form of the ocular tubercle readily separates the two.

A specimen was taken in 125 fm. on 3 May, 1903, and is, I think, a young form of this species. The differences between this specimen and the adult individuals are :—

The posterior articulation of the trunk is present, but very much less distinct than the others.

Palps : the second joint is as long as the three following together. The third joint is as long as the two terminals together, and of these the last is a little the longer.

Ovigers : these are quite rudimentary, small, and hook-like ; no joints are differentiated, though two are indicated.

Legs : the proportions of the joints differ somewhat and are, beginning with the femur, 6 : 7 : 7 : 2.25 : 3.5. The limb is clothed with comparatively strong spinous setæ of some length, not very numerous, arranged in lines.

CHÆTONYMPHON AUSTRALE. ✓

(Plate X., fig. 14.)

Nymphon australe, Hodgson (10), p. 257.

Chaetonymphon altioculatum, Möbius (23), p. 181.

Specific characters :—

Body robust, with lateral processes not widely separated but divergent ; entire animal rather coarsely setose.

Ocular tubercle long and slender.

Palps five-jointed, proportions of last three as 7 : 4.25 : 4.

Oviger ten-jointed, denticulate spines fairly numerous, with four distinct lateral teeth on each side.

Legs short, tarsus a little longer than the propodus, the terminal claw with very minute auxiliaries.

Body robust, with stoutly developed lateral processes, which are distinctly though not widely separated, the interval increasing with age ; the body, exclusive of the anterior part of the cephalon, forming an oval of graceful proportions.

The Cephalon is expanded, and the space between the chelifori is marked by a deep groove, wide anteriorly. The neck is well defined, and behind this is the Ocular

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tubercle, a structure which varies considerably in shape and size. As a rule it is rather stout, and bears four well-developed eyes, with a variable amount of pigment. It is slightly flattened antero-posteriorly, and more or less rounded at the extremity. The cephalon and the lateral processes are provided with several long setæ, the latter also having a distal fringe.

The Abdomen is of moderate dimensions, pyriform, and rather thickly setose, not separable from the trunk by an articulation.

The Proboscis is cylindrical, slightly enlarged about its middle. It is directed downwards, and movably articulated to the trunk. No setæ are apparent on its surface.

The length of the entire body is 8mm. ; of the body only, 6mm. ; of the trunk, to the insertion of the abdomen, 4.5mm. Its width is 3mm.

The Cheliferi are well developed ; the scape is a single joint longer than the proboscis, liberally provided with long setæ of irregular size, and also having a well-marked distal fringe. The chelæ are slender, about as long as the scape. The palm occupies half the length of the entire chela, and is covered with comparatively long setæ, which are continued far on to the immovable finger. The fingers are slender and much incurved at the tips ; they are provided with a large number of closely set teeth of irregular length.

The Palps are slender and five-jointed. The first joint is quite small, the second is the largest of all, and rather sparingly provided with setæ, which are longest on its outer side ; the third joint is a little shorter, slightly enlarged distally, the setæ being more numerous and more uniform than on the preceding joint. Of the two terminal joints the distal one is a little the shorter, but together they exceed the length of the second by a trifle. These two joints are richly setose, particularly on one side.

The Ovipositor is ten-jointed ; in the female the first three joints are very small, but progressively increase in length. The fourth and fifth are subequal and much the longer of the whole series, and slightly curved in opposite directions. The sixth joint is about three-quarters the length of the fifth. Of the four terminal joints the first three progressively shorten, the terminal one being a trifle longer than the preceding, and it bears a long slender pectinate claw with eight teeth. The first four joints bear scarcely any setæ, except an inconspicuous distal fringe ; on the fifth the setæ are noticeable on its outer border, and those of the distal fringe are rather long and slender. In this particular the sixth joint is similar. The four terminal joints are all provided with a distal fringe and a number of long setæ. The denticulate spines are arranged as usual in a single row, and, counting the joints from the base of the appendage, they bear respectively 9 : 7 : 5 : 7 of these spines (Plate X, fig. 15). These numbers are not, however, rigidly adhered to. The spines consist of flattened shafts of a slightly sinuous form, bearing four well-developed teeth on each side, with traces of a fifth in large and uninjured specimens. The third tooth from the base is usually the

largest. In the fully developed male the fifth and sixth joints are remarkably swollen. The enlargement of the fifth joint affects the distal half. The eggs are large, and the spherical masses may be two in number on each limb; they are carried round the fourth joint.

The Leg extends to a length of 21mm. These appendages do not differ appreciably in size. Of the three coxæ the second is much the longest, but not so long as the other two together. The proportions of the three following joints are as 4 : 5 : 4·5. The tarsus and propodus together are as long as the femur, the former joint being the longer of the two. The terminal claw is well developed, and is accompanied by two very minute auxiliaries, not one, as stated in the 'Southern Cross' Collection, Crustacea, p. 258. The entire limb is setose throughout, the setæ abundant, and variable in size, some of them distinctly spinous. For the most part their arrangement is irregular, but on the second tibia a linear arrangement begins to be perceptible, and this is clear on the tarsus and propodus, where the setæ are much finer. The distal fringe of the first coxa is dorsal, and not so strongly developed as on the two following joints, more especially the third, where it is ventral. On the femur it is chiefly dorsal, and the setæ composing it are long and stout. On the first tibia it is complete and rather spinous ventrally; this is more strongly developed on the second tibia, where there is at least one powerful spine ventrally, and generally two on each side. The male differs from the female in being more setose, the setæ being longer, more irregular, but scarcely, if any, stronger. The distal fringe of the third coxa is particularly noticeable for the great length of the setæ composing it.

The Genital apertures of the female are conspicuous on the second coxa of all the legs; those of the male are much smaller, and can only be detected on the two posterior legs.

This species was taken in considerable numbers off Cape Adare, but inside Robertson Bay, in 20–26 fm. None were taken by the 'Discovery.' I have re-described it here to remove certain defects of the original description, and on account of the capture of a form which, after considerable hesitation, I feel compelled to regard as only a variety. This species is closely allied to *N. brevicaudatum* Miers, with which *N. horridum* Böhm has been identified by subsequent investigators. *N. brevicaudatum* Miers, can be readily distinguished from *N. australe* by the following characters:—

The trunk is more setose.

The tarsus is shorter than the propodus.

The terminal claw has two distinct, if small, auxiliaries.

The oviger bears a very much smaller series of denticulate spines, but their lateral teeth are more numerous.

I am unable to regard the *Chætonymphon altiocularum* of Möbius as a distinct species, several examples of which were taken in the vicinity of Bouvet Island during the 'Valdivia' expedition.

CHÆTONYMPHON AUSTRALE, *var.* AUSTRINORUM. ✓

(Plate IV., fig. 4 ; Plate X., fig. 15.)

Although no specimens of *Chætonymphon australe* were taken by the 'Discovery,' yet a large number of individuals of a closely allied species were taken in Winter Quarters, chiefly at the beginning of our stay there, before the ship was frozen in, and while dredging was still possible within the 20-fathom line.

At first sight these specimens seem to be a distinct species ; they are half as large again or more, and their setose covering is finer. The intervals between the lateral processes are much greater, and this is the only character of importance that separates them. Another feature of doubtful value lies in the fact that the tarsus and propodus together are distinctly shorter than the femur. In *C. australe* these two joints are as long as the femur, or very little shorter, but the slight variation that occurs prevents the acceptance of this fact as a reliable specific character.

The setose covering has already been alluded to as finer ; it is so, but subject to considerable variation both as to quality and quantity. In average specimens there are large spinous setæ on the tibiæ, especially on the second. These are, for the most part, arranged in a line but not very distinctly. Two dorsal rows, and a lateral row each side can be distinguished, these are most prominent on the second tibia. There may also be a mid-ventral row of very small spinous setæ, rather closely set. Both in *C. australe* and the specimens from Winter Quarters the ventral setæ of the femora and the two tibiæ are much less conspicuous than elsewhere. In many individuals there is a conspicuous mid-ventral row of setæ on the tarsus ; these are closely set and about as long as the diameter of the joint.

Two specimens were taken in 100fm. off Coulman Island ; of these one is comparatively small. The Ocular tubercle is rather more conspicuously flattened and very slightly constricted below the eyes. The setæ are as in the Winter Quarters specimens, but without the spinous rows which, as before noted, are not always obvious. Two other specimens were taken off the Barrier in 300fm. Lat. $78^{\circ} 25' 40''$ S., long. $185^{\circ} 39' 6''$ E. These are both males, one with young. In these the Ocular tubercle is flattened, as in the Coulman Island specimens, and the terminal claw of the leg is rather longer and more slender. The setose covering of the legs is very much finer, but its arrangement is exactly the same.

It is quite impossible to find a distinct character by which these specimens can be separated from *C. australe*, therefore I feel compelled to regard them as a variety only, and a more southern form of that species. Some comparative measurements are given below.

	<i>C. australe.</i>	<i>C. australe</i> , <i>var. austrinorum</i> .		
		W. Q.	Coulman.	Barrier.
Length of entire body	8mm.	11	7 12	12
Length of body	6mm.	8	5.5 9.5	9.5
Length of trunk, to insertion of abdomen	4.5mm.	6	4 7	7

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	<i>C. australe.</i>	<i>C. australe</i> , var. <i>austrinorum</i> .							
		W. Q.	Coulman.			Barrier.			
Length of abdomen	1.5mm.	2	1.5	2.5		2.5			
Width of trunk	3mm.	4	3	searcely 5		searcely 5			
Length of third leg	21mm.	31	18	32		37			
Proportions of femur and two tibiae	4 5 4.5	6 3.5	7 4.5	7 4	6	9 8	7 9	8.5	
Tarsus and propodus together	As long as femur, or very nearly.					Shorter than femur			

In all cases the tarsus is longer than the propodus.

The Palps are alike in all cases, but these have not been accurately measured, as this cannot be done without removal.

Fig. 4a is that of a Winter Quarters specimen.

The Ovigiers are essentially alike, the differences between one or two of the joints being very trivial (fig. 4b). The number of denticulate spines is too irregular to be of any value.

♀ 9 : 7 : 5 : 7. ♀ 11 : 7 : 5 : 8. ♂ 11 : 9 : 7 : 9.

The character of these spines is shown in Plate X., fig. 15.

The sexual difference in these organs is the same in all, and the ova, which are known in all but the Barrier specimens, are large and attached to the oviger in precisely the same way.

PENTANYMPHON.

Body smooth, very slender, with lateral processes widely separated. Five pairs of legs. Chelifori well developed, chelate ; scape a single joint. Palps five-jointed.

Ovigiers ten-jointed, terminating in a pectinate claw, the last four joints with a single row of denticulate spines.

But for the additional pair of legs it would be quite impossible to separate this genus from *Nymphon*. Only a single species is for the present recognised, and this appears to have a circumpolar distribution. It has been taken by the Scotch, German, and French Expeditions.

PENTANYMPHON ANTARCTICUM. ✓

(Plate V.)

Pentanympyon antarcticum, Hodgson (11), p. 458 ; Cole (7), p. 405 ; Bouvier (3), p. 294.

Specific characters :—

Body very slender, lateral processes long and widely separated, neck very long.

Chelifori : chelæ long and slender, shorter than scape, with short, stout, uniform, close-set teeth.

Palps : terminal joint longer than preceding, which is in turn half the length of the third.

Ovigiers : terminal claw pectinate, denticulate spines, with seven pairs of lateral teeth, the first being very small.

Legs rather long and slender, with a well-developed terminal claw and two auxiliaries ; setæ arranged in four rows on the last three joints.

The body is very slender, quite smooth, with very widely separated long lateral processes. Anteriorly it is slightly curved downwards.

The Cephalon is long and slender, longer than the second and third segments, and expanded distally into two dorsal lobes for the articulation of the chelifori.

The Ocular tubercle lies immediately in front of the first pair of lateral processes. It is short, merely a low rounded hump, in fact, bearing four well-developed eyes.

The Abdomen is very small, directed upwards, and not separated from the trunk by an articulation. It is rather conical and extends but little beyond the trunk, not nearly so far as the posterior lateral processes.

The segmentation of the trunk is distinct, the joints occurring immediately behind the lateral processes.

The Proboscis is directed downwards, cylindrical, with a slight swelling about the middle of its length; it is as long as the cephalon, and its extremity is rounded.

The Chelifori arise above the proboscis, each on a lobe of the cephalon, which is here rather more than twice its diameter posteriorly. The scape is single-jointed, longer than either the proboscis or the chela. A few delicate setæ are scattered along its length, and there is an inconspicuous distal fringe. The chela is a little shorter, the palm and dactyli occupying equal halves; the former is covered with fine setæ which also form a fringe round the base of the movable finger. The fingers are slender and much curved near the tips. Both are provided with a row of fairly stout teeth of nearly uniform size, rather closely set.

The Palps arise below the chelifori and at the sides of the proboscis; they are built on exactly the same plan as in the genus *Nymphon* (fig. 1a). The first joint is small and stout, the proportions of the remainder being 8 : 5 : 3 : 4. The second joint is sparingly setose except for a distal fringe; the other joints become more and more setose to the last, which is richly supplied. On the outer side they are more abundant than elsewhere.

The Ovigera are ten-jointed and present in both sexes. (Fig. 1 b.) They arise from very short but conspicuous processes on the lower side of the cephalon, immediately in front of the first pair of lateral processes. The details of this appendage are as in *Nymphon*. The first joint is very small, the second is twice the size, and the third, which has a very oblique termination, is a little longer still; none of these bear setæ. The fourth joint is very long, slender, and slightly curved; it carries a glandular aperture on its outer side about a quarter of its length; all the setæ are small; very few occur except as a distal fringe. The fifth joint is longer still, the longest of the appendage, and its distal half is enlarged in diameter; it is covered throughout with fine setæ. The sixth joint is rather more than half the length of the fifth, slightly curved, and on the outer side of the curve plentifully supplied with fine setæ. Of the four terminal joints the first is little more than half the length of the preceding, the other three are shorter and sub-equal; very few setæ occur, except distally. They carry a single row of denticulate spines (fig. 1c). These

spines consist of a slender shaft with a swollen base; near the base is a pair of small teeth followed by two pairs of comparatively long slender ones; the remaining four pairs are more slender and blade-like, graduating to a mere trace. The terminal claw is furnished with about nine slender teeth. Both denticulate spines and terminal claw are frequently very much worn.

With regard to the Legs, all five are practically of the same size and proportions, and though there is a considerable amount of variation in this respect it is confined to narrow limits. They may attain a length of as much as 36mm. Of the three coxæ, the first and third are sub-equal and together about as long as the second; all, especially the third, bear a few minute setæ, chiefly ventral. The proportions of the three following joints are approximately as 6.5 : 7 and 10; the tarsus and propodus are long and slender, the former being the longer. The limb is more or less covered with fine setæ. On the femur they are scanty and for the most part small; a few longer ones are to be found along the shaft and distally. On the first tibia they are comparatively long and arranged in four indistinct rows, of which the lateral ones are not easy to observe. On the second tibia they become smaller and much more numerous, especially distally, and the distal fringe is strongly developed ventrally. The same arrangement holds good for the two remaining joints, but the ventral row is very strongly developed, the setæ becoming almost spinous and closely set. The terminal claw is a powerful one, and is accompanied by two slender auxiliaries of about quarter its size.

The Genital apertures of the female are found on the second coxæ of all the legs and in the adult they are distinct enough. The apertures of the male are at all times difficult to observe, and I have only been able to distinguish them on the three posterior pairs of legs.

Nearly thirty specimens of this species were taken in Winter Quarters, at all times of the year, and in depths ranging from 12 to 125 fathoms. They vary considerably in size, a variation obviously due to age, but in essential details they are in agreement except in one particular, and that is the articulation of the abdomen to the trunk; in certain cases among the more robust forms it is distinctly articulated. The trunk in all cases is seen to be very minutely scabrous when removed from spirit. The females are more robust than the males when the sexes can be separated, a feature which is most noticeable in the femora, but extends to the first tibiæ. The males, as a rule, are rather more setose than the females.

A few of the eggs borne by one of the males are hatched. On emerging from the egg the body is ovoid, and possesses three pairs of appendages. The cheliforus comprises a stout scape with one very long seta, and a small but well-developed chela, without teeth on the dactyli; a small proboscis lies below these. Details of the other two pairs of appendages cannot be seen without special preparation, which has not as yet been undertaken. Other specimens crawling about the egg-masses show the proboscis, chelifori, the palps not clearly jointed, and four pairs of appendages, having

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three stout sub-equal joints, followed by a fourth nearly as long as the three together, only a great deal more slender, and terminating in a very minute claw; a conical abdomen lies at the extremity of the trunk, the posterior part of which is provided with a small number of very long setæ.

LEIONYMPHON.

Prof. Möbius (23) has described this genus as follows:—

“Körper kurzhaarig. Rumpf breit. Beinträger am Grunde zusammenstossend. Hals kurz und breit. Augenhügel konisch mit 4 Augen. Rüssel walzenförmig. Finger ohne Zähne. Palpen neungliedrig. Brutbeine zehngliedrig, 7. Glied beim Männchen kurz und dick; alle Glieder nur kurz behaart.”

LEIONYMPHON, *n.g.**

Rumpf ebenso breit wie lang. Die beintragenden Seitenforsätze der Rumpfglieder stossen zusammen. Kopfsegment breit. Augenträger konisch.

Rüssel walzenförmig. Scheren kürzer als der Rüssel. Finger ohne Zähne. Palpen neungliedrig.

Brutbeine zehngliedrig ohne eigentümlich geformte Dornen oder Zähne an den 4 letzten Gliedern.

An den männlichen Brutbeinen ist das 7. Glied sehr kurz, aber viel dicker als die andern 3 Endglieder.

This genus was established for the reception of a remarkably fine species, *L. striatum* (Möbius), of which however only two examples were taken, and both of them immature. A species in the same collection described by Prof. Möbius as *Colossendeis gibbosa* appeared to me to be closely related, and an examination of the two species which I have been permitted to make fully confirmed this suspicion. The ‘Discovery’ has brought from the Antarctic several species which are unquestionably very closely related. The ‘Français’ (2) has also found two species. Two more were described some years ago by Dr. Pfeffer (24), from South Georgia, and placed by him in the genus *Ammothœa*.

That the genus *Leionymphon* is very closely related to *Ammothœa* is beyond all question. To this latter genus not less than thirty species have been ascribed, but many of them present such peculiar characters that they cannot fairly be included. It is not possible here to revise the genus, but I have considered it desirable to modify Prof. Möbius’ definition of the genus *Leionymphon*, and to give a list of those species which I consider should be included therein.

LEIONYMPHON.

Body more or less robust, with transverse ridges developed to a greater or less extent. The lateral processes widely separated or otherwise; spurs rather than spines, or traces of them, occur on the lateral processes and first eoxæ.

The Proboscis is large, cylindric or pyriform.

The Palps are nine-jointed, the last five joints being short.

* “λεῖος glatt. Die 4 letzten Glieder der Brutbeine sind nicht mit eigentümlich geformten Zähnen oder Dornen besetzt.”

The Ovipiger is ten-jointed, without a terminal claw, the last four joints with an irregular series of special spines. In the male, the seventh joint bears a tuft of setæ, and the eighth and ninth joints are articulated at a considerable angle to the preceding joints.

The Legs are long, tarsus very small, propodus armed proximally on the ventral margin with a series of stout spines, claw rather large, and accompanied by two well-developed auxiliaries.

The Genital apertures occur in the male on the two posterior pairs of legs; in the female on all the legs.

The species I would assign to this genus are :—

L. striatum, Möbius, 1902.

L. grande, Pfeffer, 1889 = *Ammothoa grandis*, Pfeffer.

= *Ammothoa charcoti*, Bouvier.

L. gibbosum, Möbius, 1902 = *Colossendeis gibbosa*, Möbius.

L. minus, sp. nov.

L. clausii, Pfeffer, 1889 = *Ammothoa clausii*, Pfeffer.

L. australe, sp. nov.

L. glaciale, sp. nov.

L. spinosum, sp. nov.

I have hesitated for some time as to the position of *Ammothoa magniceps* (Thomson) from New Zealand (30). Mr. G. M. Thomson most kindly placed the whole of his collection at my disposal, but unfortunately it does not contain an adult male of this species, therefore the structure of the male ovipiger remains unknown. The transverse ridges of the trunk are prominent, but there is no trace whatever of the spurs so characteristic of *Leionymphon*. Under any circumstances, the species cannot be regarded as a true *Ammothoa*. (Mr. Thomson is in error in describing the palp as with ten joints, there are only nine.) Be the true position of this species as it may, it exhibits a preliminary stage in the transition between the diminutive *Ammothoa* and the large *Leionymphon*. The next step is indicated by *L. clausii* and *L. australe*; these two species are very much alike; from these by *L. minor*, *L. gibbosum*, and *L. grandis* to *L. striatum*. It would be difficult to give *L. glacialis* and *L. spinosum* a position in a linear series. They probably diverge from *L. striatum* in a different direction to the others.

KEY TO THE SPECIES.

Body traversed by three prominent pyramidal ridges, spinose or setose :—

Lateral processes close together—

*Proboscis half as long as body, cylindrical. *L. striatum*.

Proboscis little longer than body, cylindrical. *L. grande*.

*Proboscis as long as body, conical. *L. gibbosum*.

Proboscis shorter than body, slender, pyriform. *L. minus*.

Lateral processes widely separated—

Proboscis little shorter than body. *L. glaciale*.

Proboscis short, not half length of body. *L. spinosum*.

Body traversed by three rounded ridges, smooth :—

Abdomen vertical, base traversed by the last trunk articulation. *L. clausii*.

Abdomen oblique, some distance behind the last trunk articulation. *L. australe*.

* Known only from immature examples.

LEIONYMPHON GRANDE. ✓

(Plate VI., fig. 1.)

Ammonothea grandis, Pfeffer (24), p. 43.*Ammonothea charcoti*, Bouvier (2), p. 295.

Specific characters :—

Body robust, with three prominent transverse ridges dorsally and ventrally.

Proboscis cylindrical, very little longer than the body.

Palp 9-jointed, the last joint a little longer than any of the four preceding ones.

Oviger 10-jointed, without a terminal claw, the last four joints with simple curved spines, which increase in size to the extremity of the last joint.

The body is stout, and with the abdomen, scarcely as long as the proboscis, being just less than 15mm. Its width across the second pair of lateral processes is 10mm. Its segmentation is complete, but concealed by a very strongly developed pyramidal ridge which lies along the posterior margin of the three anterior segments, and the apex of which is raised considerably above the body level. These ridges have a very slight curvature forwards, which is most marked in the first. The lateral processes are not widely separated, the two anterior pairs are directed forwards, the first more than the other, and are quite close together; the third pair is directed backwards slightly with a wider interval between it and the preceding pair; the last pair is directed backwards at such an angle as to make the interval between the third and fourth pair very conspicuous. All have a swelling at the distal extremity, and this swelling gives the process an angular appearance.

The Cephalon is short, expanded anteriorly, and at the base of the chelifori presents the same angular appearance as the lateral processes. A slight median groove divides its anterior margin.

The Ocular tubercle lies in the middle; it is stout, with a very slight curvature, rounded at the apex, and bearing four well-developed eyes.

The Abdomen rises from the extremity of the trunk, but without trace of segmentation; it is rather stout, slightly curved, and directed upwards. There is a median tubercle between the posterior transverse ridge and the abdomen. Dorsally the entire body is rendered scabrous by the presence of small spinous setæ; between the body ridges however they are scarce. Ventrally the three transverse ridges of the dorsum are represented by three similar ridges, thinner and not produced to such a conspicuous point; all are directed backwards to a varying degree, the first more so than the others. These ridges are continued on to the base of the lateral processes, which here do not present any trace of the angular enlargements so conspicuous dorsally. The spinous setæ of the dorsum are not present.

The Proboscis is stout and cylindrical, only a trifle longer than the body and abdomen together. It is articulated to the body, and movable through a very considerable angle. The mouth is large and triangular. The distal extremity of the organ is deeply pigmented; for nearly three-quarters of its length it displays six

bands of a dark yellowish-brown colour; it then abruptly changes colour, and tapers a little to its junction with the body.

The Chelifori are rudimentary, and arise from the cephalon dorsal to the proboscis, and rather in advance of its origin. The scape is short and stout, slightly curved, and with the distal extremity oblique. Articulated to it is a mere knob which bears at its extremity a minute tubercle in a distinct socket, and on its outer border a small spine. The entire appendage is covered with minute spinous setæ.

The Palps are nine-jointed, and arise from the cephalon immediately below and external to the chelifori. The first joint is small, and the second is very nearly four times as long, the third is again small, and the fourth nearly twice as long as the second. The remaining five joints are together but little longer than the fourth, and differ but little in size; the terminal one, however, is the longest of this series. The entire appendage is covered rather irregularly with the characteristic small spinous setæ of the animal. They are not numerous on the proximal four joints, but on the remaining five they are rather longer and finer, as well as being a little more abundant.

The Ovigera are ten-jointed, and arise ventrally at the angles formed by the first pair of lateral processes and the body. All the joints are small, the second and fourth being a little the longest (fig. 1a). The first joint is very small but stout, the second and fourth are the longest and sub-equal, the third is shorter and slightly curved. From the fourth the three following joints progressively decrease a little in length, the first three forming a curve in the natural position of the appendage. All these joints are stout, the three terminal ones becoming more and more slender; the eighth joint, though more slender, has the same character as the preceding, the ninth is a little shorter, and the last one is the longest of the four terminals. The entire limb is covered, but not thickly, with small setæ; they are most numerous on the fourth, fifth, and sixth joints, on the latter of which they are conspicuous only on the outer side of its curvature. The remaining four joints form a curve in a contrary direction, and on the inner side of this curve is a row of stout curved setæ, increasing in size and strength to the end of the terminal joint, where they form a conspicuous group. These spines are quite simple, and the last joint does not bear a claw, though it seems adapted for one.

The Legs are stout but not of any excessive length, being something like 62mm. The second coxa is fully as long as the other two together, and the proportions of the remaining joints are as—15 : 13 : 17 : 1 : 5. The first coxa is marked with a median dorsal and ventral line which separates the muscles moving the succeeding joint, the distal margin is tuberculated dorsally like the lateral processes, but only to a very slight extent; the second coxa is conspicuously wider in diameter at its distal than at its proximal extremity. All three are covered with very small but stout setæ. The femur is a stout joint, its distal extremity being raised dorsally into a slight angular ridge; the entire joint is covered with the characteristic setæ with the exception of a

lateral band of some width, almost completely bare of them. On the two tibiae the same arrangement of the setae occurs, except that along the middle of the bare band there is a narrow band of setae two or three wide. The distal fringes of the femur and first tibia are not conspicuous, but that of the second tibia is formed of stout spines chiefly on the ventral surface. The tarsus is a very small joint, and forms a cup-like socket for the propodus (fig. 1b); it is thickly covered with small spines, and its distal fringe is well developed, especially ventrally, where it is formed of very stout spines. The propodus is covered thickly with stout setae with only an irregular vestige of the bare band found on other joints; it is slightly curved, and its ventral side bears proximally four or more very stout spines, of which the first is the smallest; the rest of the margin is taken up with setae small, but larger than the average; close to the terminal claw is a group of large setae, one of which at least is a rather prominent spine. The extremity of the joint is oblique, and forms a rounded spinose projection or heel beyond the origin of the stout claw, which, with its two powerful auxiliaries, arise from a common investment.

The single adult specimen captured is a female, and the Genital apertures are conspicuous on the second coxa of each leg. Five smaller specimens were, however, taken at the same time and place, varying in size from 9.5 mm. to 18.5 mm. over all. These present several differences of no small importance. The proboscis differs slightly in form, being more tapering the smaller the specimen, and it is also more rigidly articulated to the body; in none of them is it movable through so large an angle as in the adult. The chelifori are proportionally the same size as in the adult, but a perfect chela is developed. This is small and feeble, the fingers curved like a pair of callipers, and devoid of teeth. On the body the dorsal ridges are raised into a more definite median point, and the tubercles which give an angular appearance to the lateral processes and first coxae of the adult are now rather more prominent and carried on to other joints. The pre-abdominal tubercle is a very variable structure, and is sometimes prominent—in one case almost absent. The palps do not call for any fresh description, but the ovigers show several interesting stages in their development (figs. 1c-1f). In the smallest specimen only the merest vestige of such an appendage exists. In the next specimen four joints as such may be distinguished, the last one showing an indication of future segmentation. In another, six joints are fairly well established, the penultimate one showing traces of another division. In the largest of the immature specimens the oviger possesses the full number of ten joints, but they are very small, and the four terminal ones are only indicated and not clearly developed.

Cape Wadworth, Coulman Island, 8-15 fathoms. Bottom: stones. Several adult specimens were taken by the 'Français' off the west coast of Graham's Land, and one was taken by the 'Scotia.' The examination of Professor Pfeffer's *Ammonothea grandis* from South Georgia has established the identity of this species beyond all question.

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LEIONYMPHON MINUS. ✓

(Plate VI., fig. 2.)

Specific characters :—

Body rather robust, with three prominent transverse ridges produced to a point in the mid-dorsal line.

Proboscis shorter than the body, slender, pyriform.

Palp 9-jointed ; the terminal joint twice as long as any of the preceding four.

Oviger 10-jointed. In the male the three terminal joints bear an irregular series of stout but simple spines. No terminal claws.

The body is rather robust and the lateral processes are clearly but not very widely separated. It measures rather less than 5 mm. in length and less than 4 mm. in extreme width. The segmentation is distinct, and the articulations lie at the hinder part of the three transverse ridges which cross the body. These ridges are strongly developed, produced to a point in the middle line, and slightly curved backwards. They are equally prominent ventrally, but inflected backwards and not produced into a point. The lateral processes are stout, the two anterior being directed forwards at slightly different angles, the two posterior ones are similarly directed backwards ; each bears dorsally two distinct tubercular processes which are also to be found in a less prominent degree on the first coxæ.

The Cephalon is scarcely, if at all, expanded, and its centre is occupied by a very stout Ocular tubercle which is directed slightly forwards, and appearing, in certain aspects, to be enlarged near its extremity, which bears a very rudimentary spine. The four eyes are not particularly well developed.

The Abdomen is short and stout, not separated from the trunk by an articulation ; it is directed obliquely upwards and does not extend as far backwards as the last pair of lateral processes.

The Proboscis is pyriform, slender, and about two-thirds the length of the body, to which it is flexibly united. It shows indistinctly three pairs of longitudinal bands along the greater part of its length.

The Chelifori are rudimentary ; the scape is well developed, slightly curved, and bears only a few small setæ besides the rather prominent distal fringe. The chelæ are reduced to a knob with the merest traces of fingers.

The Palps are 9-jointed and rise at the side of the proboscis ; the first and third joints are quite short and subequal, the second and fourth are also subequal and about five times as long ; the four following are quite short and subequal, while the terminal one is ovoid and twice as long as any of the preceding four. The fourth joint bears a small distal fringe, but otherwise there are practically no setæ on the first four joints ; the following four joints are very considerably dilated ventrally, and this enlargement bears a dense tuft of small stiff setæ. The terminal joint is more extensively covered with setæ, especially on its ventral side.

The Ovigers are 10-jointed and rise ventrally just in front of the first lateral

process (fig. 2a). The first joint is small and stout, the second is more than twice as long, stout and enlarged distally, the third is scarcely as long and has an oblique termination. These three joints form a curve in one direction, and the three following form a similar curve in another. The fourth and fifth joints are long and subequal, the sixth being about half the length of either; its termination is rounded, the following joint being articulated at the side. All these joints are more or less plentifully setose; the setæ are very small, but their structure and arrangement call for no comment. The seventh and succeeding joints progressively decrease in length and stoutness as far as can be made out from the angle at which they lie, and they are all small. The seventh lies at right angles to the sixth, and near its distal and inner side it bears a dense tuft of long setæ. The eighth joint is articulated at the side of the seventh and at right angles to it; it also bears a small tuft of long setæ near its distal extremity but on its outer side; the following joint is similarly provided, but with fewer. The last three joints bear an irregular series, not a single row, of stout spines (fig. 2c); most of them occur on the terminal joint, but there are scarcely a dozen altogether. There is no terminal claw.

The Ovipositor of the female is essentially different to this (fig. 2b). All the joints are smaller, the third conspicuously smaller than the preceding, and the fourth, though the longest of the appendage, is still quite short, and the remainder gradually and progressively decrease in length. Up to the sixth the joints remain stout, the rest are much more slender, and there is nothing noteworthy in their articulation, which is quite normal. The sixth joint is thickly covered on its outer side with minute setæ, and up to this joint the setæ have been increasing in number. The terminal joint is unfortunately missing in the specimen examined, but the three preceding are almost devoid of any setæ at all.

The Legs measure about 28 mm. in length. The second coxa is scarcely the length of the other two together, the femur measures some 7 mm., the first tibia is the merest trifle shorter, the second a little longer, 7.5 mm., the tarsus and propodus together are about one-third the length of the second tibia. The second coxa bears a small but distinct tubercular enlargement just beyond the middle of its length dorsally, and in the male there is a similar tubercle dorsally near the extremity of the femur, with a glandular aperture upon it. The entire limb is setose, but the setæ are very small; no definite arrangement can be seen as far as the first tibia, up to this joint they are not numerous and only visible with difficulty. On the tibiæ they become numerous; on the first their arrangement is indistinct, on the second it is more readily made out, and consists of a dorsal and a ventral band of setæ with another narrow band passing along the centre of a bare space laterally. The distal fringes are but poorly developed, the most conspicuous one being on the second tibia and chiefly ventral. The tarsus is a very small cuplike joint, densely setose on its longer and ventral margin. The propodus is slightly curved and dorsally projects considerably beyond the insertion of the large terminal claw and its strong auxiliaries. The joint is thickly covered with stout

setæ on its ventral surface, and proximally there is a row of some four to six very strong spines; dorsally the setæ are similar, but not so thickly distributed nor so strong; laterally also they occur, and there appears to be a narrow band devoid of setæ, but this is not distinct. The terminal claw and its auxiliaries arise from a process on the ventral side of the prolongation alluded to above.

The type of this species is an adult male bearing eggs, taken in Winter Quarters at a depth of 125 fm., 9 Feb., 1903. Another was found at a depth of 35 fm., 5 March, 1903. The ova are small and are carried in a large, rather irregular mass round the fourth and fifth joints of the oviger. The Genital apertures occur ventrally at the distal extremity of the second coxa of the two posterior legs. They are large, with tumid lips. Genital apertures of the female are on all the legs. A male and a female were also taken off Cape Wadworth, Coulman Island, in 8-15 fm., 15 Jan., 1902. These are smaller than the type.

LEIONYMPHON AUSTRALE.

(Plate VII., fig. 1.)

Specific characters:—

Body robust, with three low rounded transverse ridges; these ridges are more prominent ventrally. Abdomen directed obliquely upwards, and well behind posterior trunk articulation.

Proboscis pyriform, little shorter than the body.

Palp 9-jointed, the seventh and ninth being a little the longest of the five terminal joints.

Oviger 10-jointed, without a terminal claw, the last four joints with an irregular series of denticulate spines.

The body is robust and, without taking the lateral processes into consideration, broadest about the third process, from which it gradually narrows forwards.

The Cephalon is but slightly expanded and the neck is not distinct. The entire body measures 9 mm. in length, of which 4 mm. are taken up by the proboscis; the Abdomen does not enter into consideration, as in its natural position it is carried obliquely upwards, and does not extend beyond the last pair of lateral processes; it is, however, $1\frac{1}{2}$ mm. long. Segmentation is distinct, except so far as regards the abdomen, and occurs on a low ridge which crosses the body immediately behind the lateral processes. These ridges also occur ventrally and, being reflected backwards, give to each segment the appearance of being socketed into a recess. The lateral processes are not widely separated, but the intervals increase slightly from before, backwards; all are provided at their distal extremities with two small spur-like processes; these are dorsal.

The Ocular tubercle is stout, moderately tall, rounded at the apex, and bears four well-developed eyes.

The Proboscis is movably articulated to the body and pyriform in shape, its diameter increases for more than a third of its length, and then enlarges abruptly, and is marked by three double bands, presumably muscle bands, transversely divided near the tip. The mouth is triangular, not large, but with thick lips.

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The Chelifori are rudimentary and comprise a stout scape of one joint, which is slightly curved; except for a distal fringe which is not conspicuous, the joint is not setose. The chelæ in the adult are only represented by knobs, and these show the merest traces of two fingers. In younger specimens the chelæ are developed and exhibit comparatively long curved fingers devoid of teeth.

The Palps are nine-jointed and arise at the side of the proboscis. The first joint is short and stout, the proportions of the three following are as 5 : 1 : 4; the remaining five are all short and differ little in size, the first and third are sub-equal, the second and terminal are very little shorter but also sub-equal, the penultimate is the shortest; the last joint is ovoid in shape, setose throughout, the setæ more thickly distributed on its inner margin. The other four joints have slender bases and are much enlarged and densely setose on the inner margin; the outer margin is straight and bears a distal fringe. The preceding joints are also more or less setose, the short setæ beginning near the distal extremity of the second joint and becoming fairly numerous on the fourth.

The Ovigera are ten-jointed and arise ventro-laterally immediately in front of the first pair of lateral processes; they differ in the two sexes. In the male (fig. 1a), the first joint is small and stout, and the proportions of the five following are as 4 : 2·3 : 4 : 4 : 2; the first of these, second of the appendage, is slightly curved; the next is less so, but with the three following forms a large curve, the fifth joint being the only one that is distinctly curved itself. All these joints are setose, particularly on the outer side of the curvatures. The four remaining joints are short; the seventh is articulated at the end of the sixth, but at the side, and makes nearly a right angle with it; near its distal extremity it is provided with a dense tuft of long setæ. The eighth joint is similarly articulated to the seventh, but in the opposite direction, and bears a smaller tuft of long setæ distally; the ninth is the shortest joint. The three terminal joints bear a small number, less than a dozen, of denticulate spines, most of which occur on the terminal joint. They are not in a single row, and consist of a slender shaft with seven closely-set flat teeth on each side.

The oviger of the female is quite different and the articulation of its joints is normal throughout (fig. 1b). The first and third joints are together equal to the second; the fourth and fifth are sub-equal, and the longest on the appendage; the sixth and seventh are a little shorter and sub-equal, the eighth and tenth are again shorter and sub-equal, and the ninth still shorter. Setæ are scarce, and the sixth joint is the only one that can be described as setose. The denticulate spines occur on the four terminal joints, and are exactly like those of the male, but much more numerous, there being upwards of a dozen on each of the joints except the first of the series.

With regard to the Legs, the second coxa is scarcely as long as the other two together; the proportions of the three following joints are as 6·5 : 6 : 7·5;

these joints are subject to variation, but not of great moment, .5 mm. or thereabouts; the tarsus is quite small and cup-shaped, the propodus rather more than a quarter the length of the second tibia. The entire limb is covered with short setæ, but on the second tibia and the propodus there are longer ones interspersed among them. Throughout the entire limb there is a broad lateral band devoid of setæ except for a narrow row of them along its centre; dorsally and ventrally the setæ are abundant, particularly towards the extremity of the limb. The distal fringes are normal and inconspicuous, *i.e.*, indistinct on the first coxa, ventral or chiefly so on the other two, complete on the femur; on the two tibiæ they are best developed ventrally, and become spinous, especially on the second; the tarsus is covered with small spines or spinous setæ ventrally, the propodus has a very prominent heel and bears a stout claw with two well-developed auxiliaries rather more than ¹/₂ half its size. The heel bears numerous spinous setæ, and at the proximal end of the joint on its ventral margin there are some half-dozen stout and prominent spines.

The Genital apertures occur on the second coxæ of all the legs in the female, but they can only be found on the two posterior legs of the male. The ova are small and numerous and are carried in a spherical packet round the fourth joint of the oviger.

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Several specimens of this species were taken in Winter Quarters at depths varying from 25 to 125 fms., the majority however coming from the latter depth. The specimens vary in age and size, but the species may be regarded as a variable one. While the general arrangement of the setæ remains the same it is not so clear in the young examples. In these the setæ are for the most part long and fine instead of short and comparatively stout; the transition from the one form to the other is gradual, some of the adults retain a goodly proportion of the long setæ among the others. A very few minute setæ may be found on the body in some individuals, especially on the abdomen. In most individuals the summit of the ocular tubercle bears a very short spine instead of being rounded. In the young the chelæ are fairly well developed, they are of moderate size, the fingers being quite smooth and resembling a pair of callipers. The spur-like tubercles on the lateral processes of the adult are, in the young, very prominent spines and frequently bifurcated; similar spines occur on the cephalon. One specimen has the oviger not completely developed and in another the full number of joints is not yet differentiated.

All the adults possess a glandular aperture of some kind on the dorsal surface of the second coxa just beyond the middle of its length.

One individual has the second and third legs of the left side abnormally developed, probably new growths in reparation of injury; one of these limbs does not extend beyond the extremity of the first tibia, the other is longer.

This species very closely resembles *L. clausi* Pfeffer, but may be readily

distinguished by the fact that in that species the abdomen is directed almost vertically upwards, and is situated so far forward that the posterior trunk segment passes over its base, a feature of, possibly, some morphological importance.

LEIONYMPHON SPINOSUM. ✓

(Plate VII., fig. 2.)

Specific characters :—

Body stoutly built, with the transverse ridges not very strongly developed, but with a very prominent spur in the mid-dorsal line. The lateral processes are rather widely separated, and bear distally two stout recurved spurs ; smaller ones exist on the first coxæ.

Proboscis short, not half the length of the trunk.

Palps 9-jointed ; of the five terminals the seventh and ninth are a little longer than the others.

Oviger 10-jointed, special spines not denticulate.

The entire animal is heavily built, and covered with fine but short setæ. The lateral processes are rather widely separated, the intervals increasing posteriorly, two pairs of processes are directed more or less forward, the other two pairs backward. Each process bears dorsally at its distal extremity a pair of prominent recurved tubercular processes ; these are also distinct, though less prominent, on the first coxæ. The body is crossed transversely by three ridges, but these do not extend on to the lateral processes as much as in the allied species. These ridges stand erect, but they are bevelled from behind in the middle line so as to form an acute point of some considerable elevation, and this gives them the appearance of being arched forward.

The Cephalon is not very much expanded, and almost fills the interval between the first pair of lateral processes ; in front it bears a pair of tubercular processes directed outwards, one at the base of each of the chelifori.

The Ocular tubercle is just behind the centre of the cephalon and is very stout, taller than any of the transverse ridges, and terminates in a cone above four well-developed eyes.

The Abdomen is not separated from the body by an articulation ; it is of normal proportions, elongate, ovate and directed slightly upwards.

The entire body is covered with short, fine setæ, but they appear to be deficient between the ridges, and to some extent on the cephalon. Ventrally the transverse ridges are rounded, and the median spur much less prominent than dorsally ; the setæ also are deficient. The length of the body is 13 mm., and its extreme width is 8 mm.

The Proboscis is short and stout, being barely 5 mm in length, cylindrical, slightly swollen in the middle, and movably articulated to the body.

The Chelifori are rudimentary, they lie close together above the proboscis and are more than half its length. The scape is half the length of the proboscis, very slightly enlarged distally and clothed with short setæ ; the chelæ are only knobs, also setose, and with but vestiges of the fingers.

The Palps rise laterally below the chelifori and comprise nine joints (fig. 2a). The first joint is short and stout, the proportions of the various joints being : 1·5 : 4 : 1 : 3·5 : 1 : 1 : 1·3 : 1 : 1·5. The entire appendage is covered with fine setæ which become numerous on the fourth joint ; on the four following joints they form a dense patch covering the

whole ventral surface, and extending dorsally in a very small degree on the first of these joints but progressively more and more as the extremity of the appendage is approached. The terminal joint is completely covered, but they are most abundant ventrally.

The Ovigerae are ten-jointed and rise ventrally in the angle formed by the cephalon and the first lateral process (fig. 2b). The first six joints form the normal double curve and are all more or less covered with small setae on the outer part of the curvatures. The proportions of the various joints are : 1.5 : 3.25 : 2 : 3 : 3 : 2 : 2 : 2 : 1.5 : 2. The last four joints are provided with a few large spinous setae forming, on three of the joints, a small irregular group ventrally near the distal extremity ; on the terminal one, which is much the most slender, they are scattered along its length, one of them taking the place of the terminal claw.

The Legs are not all the same size, the third pair being the longest and the first the shortest, their respective lengths being approximately 30 mm., 35 mm., 39 mm., 37.5 mm. The third leg of the right side has been measured. Of the three coxae the second is longer than either of the other two, the three together attain a length of 8 mm., and the proportions of the other joints are as 9.25 : 9 : 8 : 3.5, the last figure representing the tarsus and propodus together. The entire appendage is densely clothed with rather short but fine setae having no special arrangement, except that on the femur and first tibia they are not so numerous laterally. The tarsus is small, cuplike, densely setose, but with no strong spines. The propodus is slightly curved, densely setose, and with an oblique termination to the joint, but the process from which the large terminal claw and its two moderate-sized auxiliaries arise projects beyond the joint itself. The ventral margin of the propodus is spinose but varies greatly. In the best instance there is a series of eight spines, the first four are small and then they increase in size rapidly to the last, which is very large. These occupy the proximal half of the joint. Then follows another series of six of nearly uniform size and not so large as the biggest of the previous series. This second series occupies the remainder of the joint and are disposed radially. In other cases the first series is not so well developed and the second is deficient.

The single specimen of this species is an adult female, the Genital apertures are found near the middle of the second coxae of all the legs.

Taken in 300 fathoms off the Barrier. Bottom : mud. January 27, 1902.

LEIONYMPHON GLACIALE. ✓

(Plate VII., fig. 3.)

Specific characters :—

Body well built, with three very prominent transverse ridges produced to a point in the mid-dorsal line. Lateral processes rather widely separated, and with the stumps of spur-like processes distally.

Proboscis large, but shorter than the body, pyriform.

Palps 9-jointed, the five terminals being sub-equal in size.

Oviger 10-jointed (not mature).

This is a large and comparatively slender species.

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The Body is well built with the lateral processes rather widely separated, and traversed by three very prominent pyramidal ridges which conceal the segmentation. These ridges are directed backwards to a very slight extent and excavated posteriorly; it is in the hollow thus formed that the segmental divisions may be seen. Three ridges are equally prominent ventrally, but they are not produced to a median point.

The Cephalon is not very much expanded, and a neck is not noticeable.

The Ocular tubercle is stout, not as tall as any of the three transverse ridges, and bears four well-developed eyes, above which it terminates in a short cone.

The Abdomen is rather long, directed obliquely upwards, not separated from the trunk by an articulation, and terminating in a blunt point. The cephalon bears a small blunt tubercle at its anterior margin on the outer side of the base of the chelifori, a pair of similar tubercles occur dorsally at the extremity of the lateral processes; smaller ones also on the first coxæ with traces of them on the second. The length of the body is 12 mm., its extreme width is 7 mm. The entire body is scabrous, a feature most distinctly noticeable on the transverse ridges and the abdomen.

The Proboscis is large, rather pyriform in shape, and measuring 10 mm. in length. It is movably articulated to the body on a large base, and widens slowly for one-third of its length where it is very slightly constricted; it is then enlarged again, and tapering very slightly, ends in a rather broad round point, the triangular mouth being of moderate dimensions. The proboscis is smooth, and its distal two-thirds are marked by three pairs of longitudinal bands, transversely divided near the tip.

The Chelifori are rudimentary and lie close together above the proboscis. The scape is short, slightly curved and enlarged distally; the chelæ are well developed, as long as the scape, one half of their length is taken up by a bulbous palm; the fingers are slender, quite smooth and much curved, but those of the two appendages are not exactly alike. With the exception of the fingers the entire appendage is scabrous.

The Palps arise laterally just outside the chelifori, and comprise nine joints (fig. 3a). The first is short and stout, the proportions of the second and fourth are as 8 to 11, the third being but little longer than the first; the remaining five are short and sub-equal, the middle one and the last being a trifle the longest, together they scarcely equal the length of the fourth. The fourth joint possesses a prominent tubercle with a glandular opening at two-thirds of its length. The entire appendage is more or less plentifully clothed with very minute spinous setæ; these however are only conspicuous on the ventral margin of the five terminal joints and at the end of the terminal one.

The Ovipositor is ten-jointed and rises ventrally immediately in front of the first lateral process, and appears to be that of a female (fig. 3b). It is not fully developed. The first joint is short and stout, the two following are twice as long and sub-equal, the third having the usual oblique termination. These three joints form a natural

curve in one direction, and the three following curve in another. Measured in their extreme length the proportions of the various joints of the appendage are : 3 : 6 : 6 : 8 : 7.75 : 7 : 4 : 4 : 2.5 : 4. The third and following joints are all more or less covered with very short stout setæ on the outer side of their curvature ; these setæ are most conspicuous on the fourth, fifth, and sixth joints, on the last of which they are also lateral. The last four joints each bear a small number of stout but simple spines, 4 : 8 : 7 : 6, not arranged in a single row. The last joint tapers to a blunt point, and is without a terminal claw, a small group of these spines taking its place.

The Legs attain a length of about 55 mm. Of the three coxæ the second is twice the length of the other two, the proportions of the remaining joints being 13.5 : 12 : 16 : 4, the last figure representing the tarsus and propodus together. The coxæ are densely clothed with very minute setæ, but on the femur they are much larger, though still small, and more conspicuous. They are arranged as a dorsal and a ventral band, separated laterally by a considerable interval, along the centre of which is a narrow band of similar setæ. This arrangement is continued along the tibiæ but it is not so distinct on the second. The distal fringes are quite normal and inconspicuous. The tarsus is a very small cup-like joint, covered with spinous setæ ventrally, with a few prominent ones distally. The propodus is uniformly covered with small spinous setæ, but ventrally there is a row of stout spines running the whole length of the joint. These spines are very irregular ; beginning from the proximal end the first three or four rapidly increase to large dimensions, the rest are very irregular in size, but none are so large as the last of the proximal series. The joint terminates obliquely, the dorsal projection is not large ; the terminal claw is stout, and its two auxiliaries are quite half as long, arising together from a process of the oblique termination.

The single specimen of this species is immature, and was taken in Winter Quarters at a depth of 125 fathoms.

AUSTRODECUS.

Body stout, and distinctly segmented, with lateral processes close together. Ocular tubercle anteriorly situated, long, with four well-developed eyes.

Proboscis immovably articulated to the trunk and ventral in position ; long, tapering, slender.

Chelifori absent.

Palps 6-jointed.

Oviger 6-jointed ? no terminal claw.

Legs short ; genital apertures on the second coxæ of all the legs in female. (Male as yet unknown.)

I have considered the affinities of this and of the succeeding genus in the introduction to this memoir.

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AUSTRODECUS GLACIALE. ✓

(Plate VIII., fig. 1.)

Specific characters :—

- Body stout, segmented, with lateral processes close together.
- Proboscis long, tapering and curved near the extremity.
- Chelifori absent.
- Palps 6-jointed ; terminal joint articulated to one side of the penultimate.
- Ovigers 6-jointed ?
- Legs short, first coxæ armed dorsally with two spurs.
- Abdomen long and slender.

This is a diminutive species ; the entire animal does not cover a space 8 mm. square.

The trunk is stout and distinctly segmented ; the lateral processes are not widely separated, but as they are rather short and tapering, the intervals at their distal extremities are very pronounced. The first coxæ, which are the largest, all bear dorsally a pair of stout tubercular spines which are very prominent. Each of the four segments of the trunk bears a stout tubercle of some elevation in the middle line, and close to its posterior border.

The Cephalon is scarcely expanded, and almost fills the interval between the first pair of lateral processes and their first coxæ. Anteriorly it bears a very long Ocular tubercle which is directed obliquely forwards, flask-shaped and truncated at its extremity, on the upper surface of which, in a compact group, are four very well-developed eyes.

From the truncated end of the trunk the Abdomen projects horizontally ; it is rather long and not separated by an articulation. On the ventral surface of the trunk a slightly raised band passes transversely between the first three pairs of lateral processes, with the last pair the band is interrupted in the middle line.

The Proboscis is long and of a peculiar shape, not unlike the snout of a weevil beetle. It is movably articulated to the body, and for about one-third of its length it is not disproportionately slender, then it tapers rather rapidly to a long and very slender structure, curved downwards near the tip. It is quite smooth and presents an annular appearance which is less distinct proximally.

The Chelifori are quite absent.

The Palps are six-jointed and arise above but well to the side of the proboscis (fig. 1b). The first joint is short and very stout, the second is long and extends beyond the extremity of the ocular tubercle. The third is very short and its distal limit indistinct. The fourth joint is rather more than half the length of the second. The second joint bears the stumps of several spinous setæ along its length ; on the fourth joint a similar number of curved spinous setæ occur, and these increase in size to the distal extremity of the joint, which also bears a few finer setæ and a small distal fringe. The last two are quite small and rather densely clothed with small setæ. The last one is articulated to one side, and not at the end, of the penultimate, and the setæ occur mainly on the outer side.

The Ovigera arise ventro-laterally, close to the angle formed by the cephalon and the first lateral process. They are extremely small, and it is open to question whether they are mature or not. As the removal of one of these appendages involves serious risk to the only specimen, it cannot be very satisfactorily described. Not less than six joints can be distinguished, the first three of which are very small. A small body-process from which the appendage arises may be an additional joint. The terminal joint is the longest, it is rounded at the extremity and does not carry any trace of a claw, nor are setæ of any kind discernible.

With regard to the Legs, the first coxa has already been alluded to as the largest of the three, the other two are very little if any shorter, and the second is dilated distally. It is difficult to get the limb in one plane for measurement, and the joints appear subject to some variation. The proportion of the joints appears to be 3.5 : 3 : 2.5 : .5 : 2.5. The femur is stout, and the two following joints decrease in calibre. The limb bears a very few scattered setæ, most numerous on the second tibia. The tarsus is very small and cup-like, with two or three spinous setæ ventrally; the propodus is proportionately long, slightly curved, and bearing a few setæ. On its ventral margin it carries a row of setæ, but there is nothing very distinctive about them. The claw is short and stout, and is accompanied by two slender auxiliaries.

The only example of this peculiar species is a female, and the Genital apertures are found in the middle of the second coxæ of all the legs.

Taken by the dredge in Winter Quarters before the ship was frozen in. Ten fathoms or less.

AUSTRORAPTUS.

Body with spurs on the lateral processes and first coxæ. Segmentation very imperfect.

Proboscis stout at the base, terminating in a point.

Chelifori rudimentary.

Palps 6-jointed.

Ovigera 10-jointed, without terminal claw or denticulate spines.

Legs comparatively long, terminal claw with two auxiliaries.

AUSTRORAPTUS POLARIS. ✓

(Plate VIII., fig. 2.)

Specific characters :—

Body rather stout, with prominent spurs on the lateral processes and the first coxæ.

Proboscis half the length of the trunk, pointed.

Palp 6-jointed, the terminal joint is twice as long as its predecessor, and articulated at an angle to it.

Oviger 10-jointed, without terminal claw or denticulate spines.

Legs long, terminal claw with two small auxiliaries.

The body is rather robust, with long lateral processes which arise close together and diverge considerably. These are provided dorsally with a pair of stout tubercular spines which exist also on the first coxæ, where they are greatly exaggerated.

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The Cephalon is considerably enlarged, and almost completely fills the interval between the first pair of lateral processes.

The Ocular tubercle is stout and tall, terminating in a cone above the four well-developed eyes. It lies well to the front of the cephalon.

The Abdomen is long, cylindrical, almost horizontal, and not separated from the body by an articulation. The extreme length and breadth of the trunk is as 6 to 5.5, the abdomen increasing the length to 7.5. The articulation of the trunk is indistinct, that separating the last segment being non-existent. The entire body appears to be perfectly smooth.

The Proboscis is about half the length of the trunk; it lies underneath the cephalon, directed obliquely downwards; it is stout and cylindrical for the greater part of its length, tapering off to a sharp cone. It is movably articulated to the trunk.

The Chelifori are rudimentary; the scape is well developed, stout, not setose, a little longer than the cephalon; the chelæ are reduced to a knob, inclined inwards at an angle of about 45° , with only the merest traces of fingers.

The Palp is short and only possesses six joints. It rises close to the proboscis, below and outside the chelifori (fig. 2a). The first joint is short and stout, and the second is three times as long; the third is again very small and, forming an elbow, is shorter on one side than the other. The fourth is the longest joint, though but little longer than the second, the only setæ visible forming a small distal fringe. The following joint is characteristic; it is small, and its inner margin is just half the length of its outer border; this outer border is well supplied with setæ distally. To the oblique termination of this joint the sixth and last joint is articulated. It is twice the extreme length of its predecessor and richly setose on its outer border and extremity.

The Oviger is 10-jointed and rises ventro-laterally at the angle formed by the first lateral process with the cephalon (fig. 2b). It is a short appendage; the first three joints are short and stout, the second and third are sub-equal in length, but not in diameter, and nearly twice the length of the first; the two following are the longest joints, the fifth being a trifle longer than the fourth and sparingly setose; the sixth is short, the seventh is longer, and the three terminal ones progressively decrease in length and diameter, the last one being very small. The last five joints are sparingly supplied with setæ. On the terminal joint there are three long and stout ones. There is no terminal claw nor are there any special spines. The oviger of the male has not been removed, but does not differ essentially.

The Legs measure some 18 mm. in length. The second coxa is fully as long as the other two together, and is much enlarged distally. The femur and first tibia are sub-equal in length, and the second tibia is a very little longer; the tarsus and propodus together are rather more than one-third the length of the second tibia. The tarsus is very small and cup-like, richly setose ventrally, the setæ being stout, one

especially so. The propodus is very slightly curved and covered ventrally with short spinous setæ, with, proximally, a row of four stout spines. Dorsally the setæ are small and scanty. The terminal claw is large, more than half the length of the joint, and accompanied by two small auxiliaries. These claws arise on a process from the oblique termination of the joint. The extreme end does not project much beyond, and is supplied with numerous spinous setæ. The rest of the limb, coxæ, femur, and tibiæ are fairly well covered with very small setæ; their precise distribution is not easy to observe, but they appear to be deficient laterally; they are most abundant on the second tibia. The lateral line is well marked on the three largest joints.

The specimen above described is an adult female, and shows conspicuous Genital apertures on a swelling at the extremity of the second coxa of all the legs. An adult male shows smaller apertures on the three posterior legs only.

The female was taken in 100 fathoms, rough ground, off the Barrier, in Lat. $78^{\circ} 16' 14''$ S., Long. $197^{\circ} 41' 47''$ E.

The male was taken in 300 fathoms, mud, off the Barrier, in Lat. $71^{\circ} 25' 40''$ S., Long. $185^{\circ} 39' 06''$ E.

RHYNCHOTHORAX.

Rhynchothorax, O. G. Costa, Microdoride Mediterranea (1861), p. 7.

I have not seen Costa's original description of this genus or its attendant species. In the 'Challenger' Report (14) it is included by Dr. P. P. C. Hoek in his list of the then known species of Pycnogonida, and at the same time condemned as being insufficiently described. It is not a little remarkable that out of ten species then recorded from the Mediterranean only one is described in Dr. Dohrn's monograph (8). Zoologists are indebted to that author for the careful and full descriptions of the Pycnogonida therein recorded. The genus and species of *Rhynchothorax mediterraneus* Costa are fully described, and differ in many particulars from the original description.

Dr. Dohrn states—

That the Chelifori are absent.

That the Palp is eight-jointed, but that fusion has taken place, reducing the number of distinct joints to five. Five distinct joints are figured, the limits of the remainder being obscure.

That the Ovigers are eleven-jointed. In both figures, however, only ten joints are shown.

I have no hesitation in placing the species described below in the genus Rhynchothorax as defined by Dr. Dohrn for these reasons: the general aspect of the animal is similar; the proboscis is cleft at its extremity; though the palps are only five-jointed, the feebly-developed extremity seems to indicate some reduction is taking place; and the ovigers are ten-jointed, and the exact counterpart of those figured by Dr. Dohrn.

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RHYNCHOTHORAX AUSTRALIS. ~

(Plate VIII., fig. 3.)

Specific characters :—

Body very robust, with lateral processes quite close together, and with median tubercles on the segments.

Chelifori absent.

Palps 5-jointed, the second joint with a very strongly developed spur dorsally.

Ovigers 10-jointed, with a terminal claw, the last four joints with a couple of spines on an enlarged base.

Legs short, terminal claw with two small auxiliaries.

Body very robust, with the lateral processes short and quite close together, widest across the first lateral process, and about half the breadth across the last.

The posterior articulation of the trunk is deficient, but immediately in front of where it should be, as on the preceding segments, is a stout median tubercle, bluntly pointed, and very slightly inclined forwards.

The Cephalon is expanded, but very short. The Ocular tubercle, which is stout, projects forwards and upwards over the base of the proboscis. It bears four well-developed eyes, the posterior pair being a little the larger, and terminates above them in a short cone. Measured from the anterior margin of the ocular tubercle, the cephalon is half the length of the first segment of the trunk.

The Abdomen is long, about as long as the two combined segments from which it originates.

Proboscis is stout, conical, a little longer than the first trunk segment. A conspicuous slit marks the mouth as the animal lies in its normal position.

Chelifori, no trace.

Palps. These appendages only comprise five joints, and are very curiously modified (fig. 3a). Each rises at the side of the proboscis and extends but little beyond it. The first joint is short and stout, the second is the longest of the appendage; its dorsal extremity is prolonged forwards and upwards as a stout spur. The third joint is about half as long as the shaft of the second, it is enlarged distally, a stout dorsal tubercle bearing a tuft of setæ; a few other setæ are more scattered. The fourth joint is small and setose, while the fifth, which is also richly setose, is reduced to a mere button.

The Oviger is very slender, ten-jointed, and rises ventro-laterally at the neck (fig. 3a). The first three joints are short, and progressively lengthen, but only to a slight degree. The fourth is nearly as long as the three together. The fifth is shorter, but swollen distally. The sixth is shorter still. No setæ are discernible on any of these joints. Of the four terminals the first three are sub-equal in length, but their dorsal surfaces become more and more curved. Ventrally, also, there are prominent projections which bear the denticulate spines. The terminal joint is very broad, and a little longer than the others; its dorsal outline is very much curved, and ventrally a large swelling occupies almost the whole surface; one small spine is

all that is visible. A prominent claw terminates the appendage. The denticulate spines are few in number, two on each of the first three joints. They are worn, and all that remains is a slender shaft of uniform diameter with three terminal teeth, of which the middle one is the largest.

The Legs are short. The three coxæ are short and stout, the second is by a very little the longest, but the first has nearly twice its diameter; it also bears a tubercle smaller than, but similar to, those borne on the middle line of the trunk. The femur is stout, and not so long as the three coxæ together, but the remainder of the appendage is much more slender. The proportions of the two tibiæ are as 3 to 2, the tarsus and propodus together being as long as the second tibia. The tarsus is a very small joint, its ventral surface being covered with minute spinous setæ. The propodus, which is curved, has a row of them along its ventral margin, separated by rather wide intervals; several setæ are scattered dorsally. The terminal claw is stout and is accompanied by two slender auxiliaries about one-third its size. A few setæ are scattered on other parts of the appendage, but they do not form a prominent feature.

The Genital apertures are distinct on the second coxæ of the last pair of legs only, and this joint is much swollen in consequence.

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This species, of which there is only a single specimen, was found by Mr. Kirkpatrick on a sponge. Winter Quarters, at a depth of 178 fm., 7 Aug., 1902.

COLOSSENDEIS.

Body ovoid or elongate, with the lateral processes close together or widely separated, as a general rule without segmentation. Cephalon small. Eyes well developed or absent.

Proboscis very large, often much longer than the body, and movably articulated to it.

Chelifori very rarely present, rudimentary.

Palps very long, 10-jointed, third and fifth joints the longest, more or less setose.

Ovigers very long, 10-jointed, fourth and sixth joints the longest, the last four joints bearing several rows of spines usually dentate. A terminal claw.

Legs without auxiliary claws; the three coxal joints short.

Abdomen of moderate dimensions, movably articulated to the trunk, sub-clavate.

Genital apertures on the second coxa of all the legs.

I defined this genus in comparison with *Decolopoda* in the *Zoologischer Anzeiger* (13), retaining as far as possible the words of Jarzynsky. Certain characters made use of by Professor G. O. Sars (25) have been incorporated, since his definition has become inapplicable in certain important features.

No less than eighteen species and two varieties have been described. Through the generosity of Professor E. L. Bouvier I have been permitted to examine the collection of Colossendeids made by the 'Travailleur' and 'Talisman,' the description of which is not yet published. The identity of these species with the known species, or otherwise, has not yet been fully established, but four new species from the Antarctic Regions are now described.

COLOSSENDEIS AUSTRALIS. ✓

(Plate IX., fig. 1 ; Plate X., figs. 1 and *2.)

Specific characters :—

Body stout, with lateral processes widely separated, minutely scabrous, the spines being arranged in distinct rows on the appendages.

Proboscis enormous, bottle-shaped, more than half as long again as the body. Eyes, four, well developed.

Palp 10-jointed, the eighth and ninth joints equal, the tenth longer.

Claw of legs less than half the length of the propodus.

Under a lens the entire animal exhibits a beautifully mottled appearance, which, to a greater or less extent, appears to be characteristic of the genus. The Body shows the faintest traces of segmentation ; the cephalon is short and only very little expanded, and the first pair of lateral processes is placed close against it.

The Ocular tubercle is situated in the middle of this area and is stout, with four well-developed eyes, two anterior and two posterior, the latter smaller than the others.

The Proboscis is of much greater diameter than the body, to which it is movably articulated ; throughout the greater part of its length it is curved downwards ; the mouth is very large. The organ is covered with minute spines, which seem to have, to some extent at least, an indistinct linear arrangement ; the difficulty of making out their precise arrangement is accentuated by a growth of polyzoa.

The Abdomen is of moderate dimensions and somewhat clavate.

The ten-jointed Palp arises ventro-laterally, as close as possible to the proboscis. The two first joints are very short, and the third is rather more than twice the length of the fifth ; the fourth is small ; the sixth is barely one-third the length of the fifth, and the seventh is about half as long again as its predecessor ; the eighth and ninth are shorter and sub-equal ; the terminal one is absent from one side and injured on the other, but in the other specimen available it is a little longer. The lateral line appears along the greater part of the appendage. The entire limb is spinose, beginning with the third joint, and the minute spines are arranged longitudinally in rows as far as the end of the fifth joint, which, with the two preceding, bears a more or less complete whorl of spines at its distal extremity. Beyond the fifth joint the spines become stiff setæ rather than spines ; they are larger and more abundant and irregular, besides being aggregated on the ventral and inner side in the natural position of the limb.

The Ovigera are very long and, as characteristic of the genus, 10-jointed (fig. 1a). They arise from a small body-process immediately behind the palps, but nearer the middle line. The first three joints are small, the fourth and sixth are the longest and sub-equal, the fifth being about a quarter their size. The last four are sub-equal, and the appendage terminates in a small claw. The lateral line is distinctly marked. The entire limb is spinous. A few minute spines exist on the first three joints, beyond these they are arranged more or less clearly in lines and are more numerous. There is also a fringe of small spines on the outer margin of the distal extremity of each

joint, but these are either inconspicuous or absent on the four terminal joints. With regard to the characteristic groups of spines on the four terminal joints, there are four rows on the three proximal joints and three only on the terminal joint. In both specimens the spines are so much worn as to give but a feeble idea of their true character (Plate X., figs. 1 and 2). The large size of the sockets in which they are planted is remarkable. The most ventral row, that which lies nearest the sea bottom in the natural position of the animal, comprises a small number, less than a dozen, of large stout spines. The second row, which in this species is not separated from the first by any conspicuous interval, contains approximately double the number of smaller spines; the sockets of this row are sometimes crowded together, and the spines are smallest and most crowded at the proximal end of the joint, and are also deflected from a straight line by the articulation of the succeeding joint. Two other rows follow, but these have not the mathematical regularity of the former, nor are they so much deflected; they are reduced in number, but not in size. In structure the large spines appear to consist of a stout base almost circular in section and composed of a strong chitinous investment having a protoplasmic core; the spine tapers to a blunt point much worn, but with enough left to indicate a flattened blade at the extremity.

The Leg attains a length of 115 mm. The three coxæ may be regarded as sub-equal in size, and short. The two tibiæ are the longest joints and sub-equal, except in the first leg, where the second tibia is a trifle shorter than the first. The femur is a little shorter, and the tarsus less than half the length of any of the three preceding joints; the propodus is just over half the length of the tarsus. On the first coxa there is dorsally and ventrally a median line of reddish colour, which appears to indicate the presence of a slight groove. On the second coxa the lateral line begins on each side of the joint, and passes to the extremity of the limb. The three coxæ are minutely scabrous and possess a small fringe of minute spines at their distal margins. The remaining joints are more or less covered with these fine spines, which become a little more conspicuous as the extremity of the appendage is reached. Six rows are fairly well defined throughout the limb, a median dorsal, a median ventral, and two lateral, one on each side the so-called lateral line. The distal extremity of each joint bears a fringe of spines on the inside of the bend, largest and most conspicuous on the second tibia. The terminal claw is small, less than half the length of the propodus.

The Genital apertures occur on the second coxa of all the legs in both sexes, as shown in figs. 1b and 1c.

The above description has been prepared from an example taken in deep water. Another from shallow water presents certain differences: first, it is more spinose, especially the proboscis and the limbs; on the legs four additional irregular rows of spines may be distinguished between the six described for the deep-water specimen, two of these are dorsal and two ventral: and secondly, in the comparative length of

certain joints. The third joint of the palp is distinctly less than twice the length of the fifth, and the fourth joint of the ovigerous leg is a little longer than the sixth.

The nearest ally of this species seems to be *C. proboscidea*, Sabine, from which, however, it may be instantly recognised by the wider intervals between the lateral processes and the presence of well-developed eyes.

Two specimens of this species were taken, one off Cape Wadworth, Coulman Island, 8-15 fm.; bottom: stones; the second off Mounts Erebus and Terror, 500 fm.; bottom: stones.

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This latter specimen is the carrier of some half-dozen cirripedes of the genus *Scalpellum*.

COLOSSENDEIS GLACIALIS. ✓

(Plate IX., fig. 2; Plate X., figs. 3 and 4.)

Specific characters:—

Body apparently smooth, with lateral processes widely separated, and four well-developed eyes.

Proboscis not quite so long as the trunk, slightly dilated about the middle, and covered with short spinous setæ.

Palps, three terminal joints sub-equal and densely setose, with wide and deep constrictions at the joints.

The body is rather stouter proportionally than the last two species, and though apparently smooth, a lens reveals a median row of extremely minute setæ.

The Cephalon is not expanded beyond the average width of the body.

The Ocular tubercle is stout, and bears four eyes, the anterior pair larger than the posterior; the portion above the eyes is acutely pointed, but this feature is variable in size. The setous character of the proboscis is not always easily discernible; in one specimen it is prominent, in others less so, even when not concealed by a growth of polyzoa. It can hardly be said that these setæ are arranged in any definite manner, but in places they give the impression of ill-defined rows.

The Abdomen is short and articulated to the trunk. The Proboscis is as defined among the specific characters and flexibly united to the trunk.

The Palps arise on the ventral side of the proboscis (fig. 2); the first joint is rather more prominent than usual, and is readily seen from the dorsal surface. The second joint is shorter, the third is considerably the longest of the appendage, the fourth is quite short, and the fifth is approximately two-thirds the length of the third; this joint has a faint constriction at about two-thirds of its length. The following joint is short, the next a little longer, the three terminal joints being short and sub-equal. The extremity of the palp has a peculiar appearance, owing to the seventh, eighth, and ninth joints, and to a less extent the sixth, having their distal extremities rounded off like the shoulders of a wide-mouthed bottle, so that each joint seems balanced on a narrow base. The entire appendage is beset with stiff setæ, almost spinous in character. On the third joint they are short, somewhat sparsely distributed, and appear to be arranged in rows. A whorl of stouter setæ (spines?)

surround the distal extremity of this joint and the next; beyond this the setæ are so thickly distributed that it is scarcely possible to make out any definite arrangement. On the fifth joint some of the setæ are distinctly longer than the majority, and from this joint the setæ on the inner side of the appendage, in its natural position, are much the longest.

The Ovigera arise immediately behind the palps on a conspicuous body-process close to the middle line (fig. 2a). The first three joints are small, and bear spinous setæ of small size. The fourth and sixth are very long and sub-equal, the fifth being not more than a quarter of their length. The four terminal joints are sub-equal in length, but decrease in stoutness. The entire appendage is setose. On the fourth joint the setæ are small and arranged in rows, and on the outer margin, at about two-thirds of its length, a small but distinct, rounded protuberance occurs. On the succeeding joints the setæ or spines, whichever they may be called, are more thickly distributed. The characteristic spines of the four terminal joints present very slight differences from the two preceding species. On the ventral side of the limb in its natural position are two rows of these spines separated by a conspicuous interval; the more ventral of these two rows consists of a few large spines, the other contains approximately double the number of smaller spines. Dorsally, and separated by an interval, are two rows of smaller spines, which are not, however, arranged with such precision as the others. Close examination reveals the fact that the intervals between the rows of spines are more apparent than real, this effect being due to the set of the first two rows and the third group or double row; the second row is deflected at the extremity by the articulation of the succeeding joint. The spines do not present any special peculiarities, being more like true spines than in the other species here described. They are somewhat curved or falciform (Plate X., fig. 3). The terminal claw is of moderate dimensions, rather slender, but with a stout base; in most of the specimens the stout base is all that is left. All four terminal joints are dorsally covered with short spinous setæ set in sockets (Plate X., fig. 4). In this species they are much more numerous than in the other three.

Concerning the Legs, the first coxa has a slightly greater diameter than the others, and bears the dorsal and ventral mark so characteristic of the genus. The other two coxæ are nearly equal in length and all are minutely spinose. The Genital apertures occur on the second coxæ of all the limbs, and the lateral line beginning on that joint is conspicuous to the end of the limb. The first tibia is the longest joint of the limb, the femur is very little shorter, the second tibia approximates to three-quarters the length of the first, and the tarsus to very nearly half its length; the propodus is shorter than the tarsus by nearly a third, and the claw is less than half the length of the propodus. The entire limb is covered with minute setæ, which, along the dorsal surface at any rate, have a distinct linear arrangement; ventrally this becomes indistinct from the second tibia onwards. The distal extremity of each joint, including the coxæ, is more or less completely girdled with spines, minute up to

the extremity of the femur, and most numerous dorsally; on the first tibia they increase in size ventrally, and still more so on the second tibia; on the tarsus and propodus the ventral setæ are comparatively long and conspicuous.

The specimen from which the above description was taken seemed to be an exceptionally spinose individual. Seven specimens were obtained, and in the other six all the features described above can be seen, though to a less degree, when not concealed by a growth of polyzoa.

Winter Quarters, 12 to 25 fathoms.

COLOSSENDEIS FRIGIDA. ✓

(Plate IX., fig. 3; Plate X., figs. 5 and 6.)

Specific characters:—

Body smooth, with lateral processes widely separated. Four well-developed eyes.

Proboscis approximately twice the length of the trunk, dilated about the centre and quite smooth.

Palps, 10-jointed; eighth joint half the size of the two terminals, which are sub-equal.

Ovigers, with a group of four or five irregular rows of special spines in addition to the two primary rows.

Claws of legs about half the size of the propodus.

This last character, together with the spines and terminal claws on the ovigers, readily separate this species from *C. megalonyx*, to which it appears very closely related.

A considerable amount of latitude must be allowed on the proportions of the joints of the various appendages as a guide to specific discrimination. Thus the proboscis varies in length from 11 mm. to rather more than 21 mm., and the trunk to the base of the abdomen, from rather less than 6 mm. to rather more than 11 mm., but the longest proboscis does not coincide with the longest body. The same sort of variation occurs throughout.

There is no trace of segmentation in the trunk, and the Proboscis is articulated to it, hence the variation of the angle to which it may be inclined.

The Ocular tubercle is stout, sharply conical above the eyes, which are well developed and four in number.

The Abdomen is quite small and articulated to the trunk.

The Palps are ten-jointed. The third joint is much longer than the fifth, which reaches almost to the extremity of the proboscis. The fourth joint is very small, and the seventh is slightly longer than the sixth; the eighth is quite short, the two terminals being twice its size and sub-equal. Towards the extremity of the fifth joint very minute setæ make their appearance, and on the rest of the appendage they are scattered in more or less definite rows.

Ovigers: These appendages arise close to the middle line behind the palps (fig. 3). The first three joints are very small, the fourth and sixth long and sub-equal, the sixth as a rule extending beyond the proboscis. The fifth joint is about half the length of the sixth. The four terminal joints are sub-equal, and the claw has a peculiar appearance, as if the inner margin had been bevelled off at a very acute

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angle. In its perfect condition it is rather long and slender, especially the distal half. Something like one-half of this slender portion, at the tip of the claw, is flattened dorso-ventrally to form a sort of protective shield to a thin membranous fold lying like a knife-edge on the under surface of the claw throughout its distal half (fig. 3a). The claw is covered with very minute hairs. The characteristic spines are very numerous, and are arranged in two sharply defined lines followed by a closely arranged group in which five rows can be distinguished. A distinct interval separates the first two rows from each other and from the group referred to above. The spines of the first row are long, slender, lanceolate in shape, and set as closely together as possible (Plate X., figs. 5 and 6). Those of the second row are approximately double in number, shorter and more spatulate, their essential structure being the same. They have a fairly stout base tapering to the centre, where it becomes a flat blade, the entire margin of which is provided with minute teeth visible under a one-inch objective. In the group of spines there are five rows arranged in an imbricate manner and as the spines of these rows alternate fairly regularly oblique rows of eight spines may be distinguished in the broadest part of the group. In structure they resemble those of the second row. Setæ are sparsely distributed over the appendage and though very minute they are not difficult to distinguish.

The legs of the numerous specimens average between 58 mm. and 106 mm. in length; the proportions of the joints do not, however, vary greatly. The first coxa bears a reddish line marking a very shallow groove dorsally and ventrally; the lateral line begins on each side of the second coxa, and is continued to the extremity of the limb. The three coxæ are sub-equal. The femur is the largest joint of the limb as a rule, the other joints decreasing in size to the extremity. The claw is about half the length of the propodus.

The Genital apertures occur on the second coxa of all the limbs of both sexes. The legs are apparently quite smooth, even to the touch, but close examination shows faint traces of rows of setæ. In some of the larger specimens these are a little more conspicuous.

Specimens of this species were taken in Winter Quarters in depths varying from 5 to 178 fathoms, and the name is derived from the fact that two of them had to be taken to the ship dry, a distance of nearly two miles, at a temperature of -50° Fahr. They suffered in consequence. Another specimen taken in 300 fathoms; bottom, mud; off the Barrier, 27.1.'02, is referred to this species.

COLOSSENDEIS RUGOSA. ✓

(Plate IX., fig. 4; Plate X., fig. 7.)

Specific characters:—

Proboscis half as long again as the body, slender, dilated about the middle, with a median row of curved spines dorsally along the proximal half.

Body smooth, with lateral processes widely separated, and, with the first coxa, dilating distally.

Palps 10-jointed, the eighth very short; the ninth rather more than twice its length; the terminal one a little larger still.

Legs provided with rows of spines, claw large.

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This species in general appearance very closely resembles the last, but may be readily distinguished by its spiny character and the features quoted above.

The Body is quite smooth, the cephalon short and without any constriction indicating a neck.

The Ocular tubercle is stout, with four well-developed eyes, the anterior pair being larger than the posterior pair. Above the eyes the tubercle is acutely conical.

The Proboscis is half as long as the body as indicated in the specific characters, and besides the median row of spines there is a lateral row of a few, widely separated. The proboscis is movably articulated to the body, and obtusely pointed distally.

The Abdomen is small, somewhat clavate, but presenting no special feature.

The Palps arise on the ventral side of the body, as close as possible to the proboscis. They arise on a process of the body which is usually regarded as the first joint, but which has always appeared to me to be doubtful whether it is a real joint or not. In this particular species it is definitely a body-process and not a true joint. The succeeding joint, here as elsewhere called the second, is very short, a mere ring-like segment. The third is considerably the longest joint of the appendage, slender and furnished with a few prominent curved spines; the fourth is quite small; the fifth is two-thirds the length of the third; and a short distance from the distal extremity there is a distinct constriction as though there had been a joint there and it had fused; the sixth is short, and the seventh is about half as long again; the eighth joint is very short, scarcely half the length of the sixth; the ninth is fully twice the length of the eighth, and the terminal one a little longer, rounded at the extremity. From, and including the fourth joint, the entire organ is covered with minute spines, too plentifully distributed to assert any regular disposition.

The Ovigera arise laterally from two body-processes close to the middle line and immediately behind the proboscis (fig. 4). The first three joints are very small and sub-equal in length; the fourth and sixth are very long and sub-equal, the fifth being about one-third of their length; of the four terminal joints, the proximal is the largest. The claw is of moderate dimensions. The entire appendage is covered with very minute spines, which become numerous from the fourth joint, and appear to be very generally distributed. The characteristic spines of the four terminal joints are limited to four rows with an occasional small spine which may perhaps be regarded as the remnant of a fifth row. It is unfortunate that in the only specimen obtained (Plate X., fig. 7) these spines are very much worn. An interval separates the two first rows, and another interval separates the second row from the remainder.

The spines of the first row are long, slender and few in number. They have a somewhat stout base which, as far as can be judged without cutting sections, appears to be rounded on one side and flattened or somewhat concave on the other; they are constricted in the middle, and produced onwards as a flat blade with dentate margins. The spines of the second row are smaller, twice the number, and placed as

close together as possible. In both these rows the spines are set at right angles to the joint, in the other rows they are arranged parallel to the length of the joint. All these are essentially the same in character, but in the "parallel" series, the spines, being viewed more laterally, appear to be curved and the blade forms a very shallow scoop.

The Legs are provided with longitudinal rows of curved spines, not very numerous, especially on the ventral surface, most abundant and conspicuous on the femur. The first coxa is conspicuously broader than the others. The lateral processes of the body are narrow proximally and widen distally, the first coxa continuing this widening. The two following coxæ are of less diameter, sub-equal in length, the distal extremity of each is fringed with minute spines, the fringe, however, not being complete. The femur is conspicuously the longest joint of the limb, the other joints progressively shorten, the amount of decrease being obvious. The claw is nearly the length of the propodus. A few additional spines are to be found ventrally at the distal extremity of some of the joints.

The Genital apertures open on the second coxa of each leg.

A single specimen of this species was taken off the Barrier in lat. $78^{\circ} 25' 40''$ S., long. $185^{\circ} 39' 6''$ E., 300 fms., bottom, mud, 27 Jan. 1902.

In the examination of this collection my thanks are primarily due to the Council of the Marine Biological Association of the United Kingdom, and to Dr. E. J. Allen, the Director, for accommodation at their Plymouth Laboratory; to Professor Chilton, of Canterbury College, Christchurch, N.Z., for enabling me to make the preliminary examination of our collections; to Mr. G. M. Thomson and Professor W. B. Benham, of Dunedin, N.Z., for so kindly placing the whole of their collections at my disposal; to Professor E. L. Bouvier, of Paris, for allowing me to examine the collection made by the 'Français' in the Antaretic as well as the unpublished collections of the 'Travailleur' and 'Talisman'; to Professor Kraepelin, and particularly to Dr. G. Pfeffer, for the opportunity to examine the collection from South Georgia, now in the Natural History Museum at Hamburg; to Professor A. Brauer, and especially to Dr. E. Vanhöffen, biologist of the 'Gauss,' for the facilities extended to me during the examination of the 'Valdivia' and other collections now in the Berlin Museum.

My best thanks are due to Mrs. L. E. Sexton for the drawings of Plates VI. and IX., Plate II., Fig. 1., Plate V. (the entire animal), Plates X., Figs. 1-7, all of which were executed with the greatest accuracy. I am further indebted to her for some considerable assistance during the progress of the work.

Messrs. West, Newman and Co. have continued the preparation of the plates, and I must thank them for the care they have taken.

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EXPLANATION OF THE PLATES.

PLATE I.

- FIG. 1.—*Phoxichilus australis*. ♀ × 2.
 2.—*Pseudopallene australis*. ♀ × 3.
 2a.—Oviger, five terminal joints. ♀ × 20.
 2b.—Denticulate spine from tenth joint. × 880.
 3.—*Pseudopallene cornigera*. ♀. Oviger, five terminal joints. ♀ × 20.
 3a.—Denticulate spine from eighth joint. × 530.
 4.—*Pallenopsis hiemalis*. ♀ × 3.
 4a.—Oviger, six terminal joints. × 27.

PLATE II.

- FIG. 1.—*Pallenopsis villosa*. ♀ × 3.
 1a.—Chela. × 18.
 1b.—Oviger. × 10.
 2.—*Pallenopsis pilosa*. ♀ Hoek. Oviger, five joints, terminal one missing. × 22.
 3.—*Pallenopsis hiemalis*. ♀. Terminal joints of leg. × 12.
 3a.—Specimen from Cape Wadworth. Terminal joints of legs. × 12.

PLATE III.

- FIG. 1.—*Nymphon hiemale*. ♂ × 2.
 1a.—Palp. × 14.
 1b.—Oviger, five terminal joints. × 16.
 FIG. 2.—*Nymphon lapare*. × 3.
 2a.—Palp. × 14.
 2b.—Oviger, five terminal joints. × 13.
 FIG. 3.—*Nymphon adarcenum*. ♂ × 8.
 3a.—Palp. × 70.
 3b.—Oviger, five terminal joints. × 80.
 FIG. 4.—*Nymphon frigidum*. × 10.
 3a.—Palp. × 56.
 3b.—Oviger, five terminal joints. × 60.

PLATE IV.

- FIG. 1.—*Chaetonymphon villosum*. × 4.
 1a.—Palp. × 17.
 1b.—Oviger, five terminal joints. × 17.
 FIG. 2.—*Chaetonymphon biarticulatum*. ♀ × 3.
 2a.—Palp. × 27.
 2b.—Oviger. × 16.
 FIG. 3.—*Chaetonymphon mendosum*. ♀ × 4.
 3a.—Palp. × 20.
 3b.—Oviger. × 32.
 FIG. 4.—*Chaetonymphon australe* var. *austrinorum*. ♂ × 3.5.
 4a.—Palp. × 14.
 4b.—Oviger. × 13.

PLATE V.

FIG. 1.—*Pentanymphe antarctica*.

1a.—Palp. $\times 27$.

1b.—Oviger. $\times 40$.

1c.—Denticulate spine from eighth joint. $\times 630$.

PLATE VI.

FIG. 1.—*Leionympha grandis*. ♀ $\times 2$.

1a.—Oviger $\times 4$.

1b.—Third leg, terminal joints. $\times 8$.

1c.—Right oviger of immature specimen. $\times 4$.

1d.—Right oviger of immature specimen. $\times 4$.

1e.—Right oviger of immature specimen. $\times 10$.

1f.—Right oviger of immature specimen. $\times 10$.

FIG. 2.—*Leionympha minus*. $\times 2$.

2a.—Oviger. ♀ $\times 10$.

2b.—Oviger. ♂ $\times 10$.

2c.—Denticulate spine from joint of oviger. ♂ $\times 265$.

PLATE VII.

FIG. 1.—*Leionympha australis*. ♀ $\times 3$.

1a.—Oviger, five terminal joints. ♀ $\times 30$.

1b.—Oviger, five terminal joints. ♂ $\times 23$.

FIG. 2.—*Leionympha spinosum*. ♀ $\times 2$.

2a.—Palp, five terminal joints. $\times 20$.

2b.—Oviger, five terminal joints. $\times 20$.

FIG. 3.—*Leionympha glacialis*. ♀ $\times 1.5$.

3a.—Palp, five terminal joints. $\times 11$.

3b.—Oviger, six terminal joints. $\times 11$.

PLATE VIII.

FIG. 1.—*Austrodecus glacialis*. ♀ $\times 15$.

1a.—Lateral view of body without appendages. $\times 15$.

1b.—Palp. $\times 56$.

FIG. 2.—*Austroraptus polaris*. ♀ $\times 5$.

1a.—Palp. $\times 40$.

1b.—Oviger. $\times 31$.

FIG. 3.—*Rhynchothorax australis*. $\times 15$.

Palp. $\times 72$.

Oviger. $\times 88$.

PLATE IX.

FIG. 1.—*Colossendeis australis*. ♀ $\times 1$.

1a.—Oviger, four terminal joints. $\times 4$.

1b.—Outlines of second coxa showing sexual aperture. ♀

1c.—Outlines of second coxa showing sexual aperture. ♂.

FIG. 2.—*Colossendeis glacialis*. Palp, terminal joints. $\times 8$.

2a.—Oviger, four terminal joints. $\times 8$.

FIG. 3.—*Colossendeis frigida*. Oviger, four terminal joints. $\times 8$.

3a.—Terminal claw of Oviger. $\times 265$.

FIG. 4.—*Colossendeis rugosa*. Oviger, four terminal joints. $\times 8$.

PLATE X.

Colossendeis.

- FIG. 1.—*C. australis*. Special spine from eighth joint of Oviger. Principal row. $\times 100$.
 2.—*C. australis*. Special spine from eighth joint of Oviger. Second row. $\times 100$.
 3.—*C. glacialis*. Special spine from eighth joint of Oviger. Much worn. $\times 265$.
 4.—*C. glacialis*. Seta from dorsal surface of ninth joint of Oviger. $\times 265$.
 5.—*C. frigida*. Special spine from tenth joint of Oviger. Principal row. $\times 265$.
 6.—*C. frigida*. Special spine from tenth joint of Oviger. Second row. $\times 265$.
 7.—*C. rugosa*. Special spine from tenth joint of Oviger. Principal row. $\times 265$.

Nymphon.

Denticulate spines from tenth joint of oviger.

- FIG. 8.—*N. hiemale*. $\times 350$.
 9.—*N. lanare*. $\times 455$.
 10.—*N. frigidum*. $\times 645$.

Chaetonymphon.

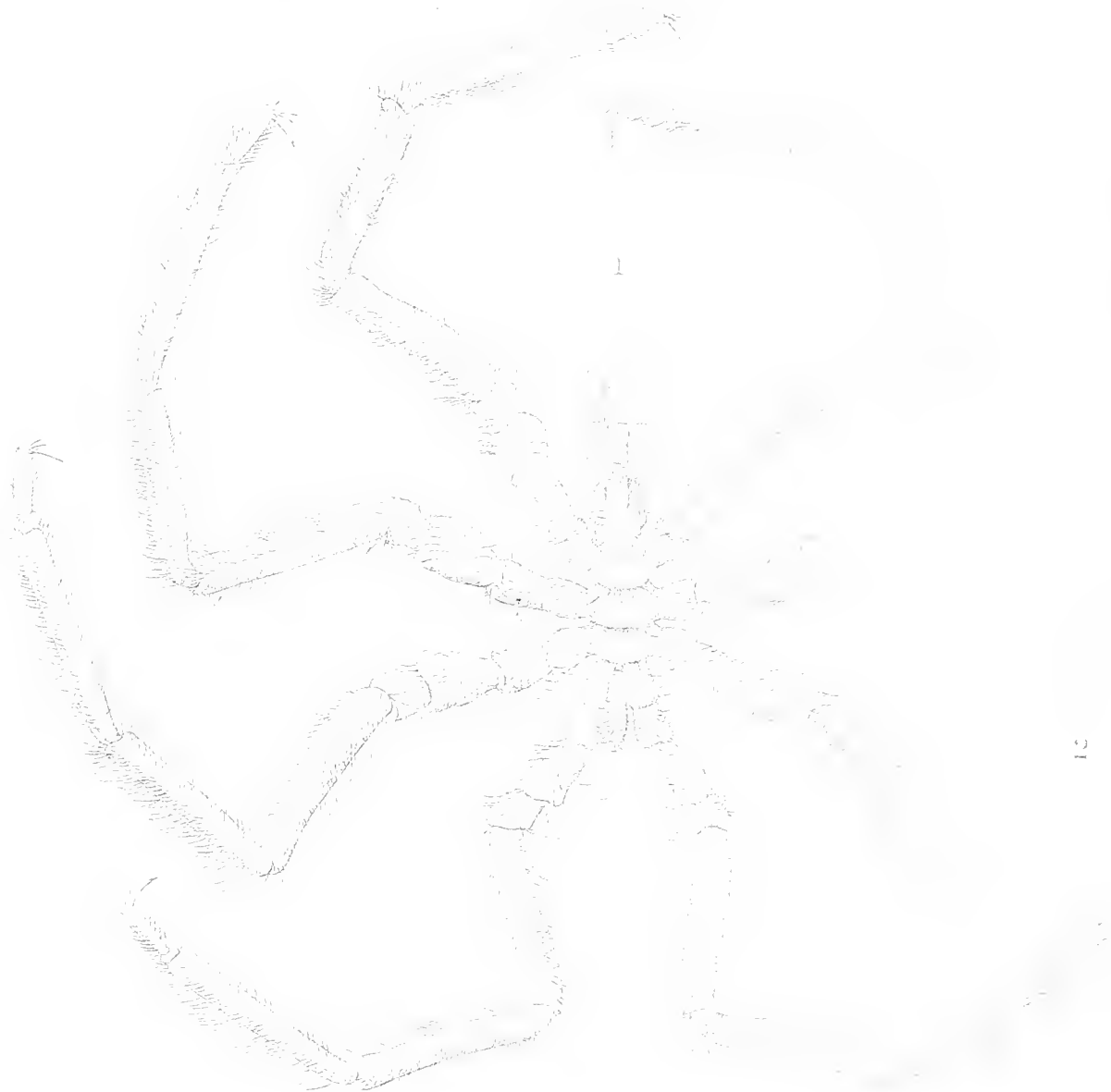
Denticulate spines from oviger.

- FIG. 11.—*C. villosum*, seventh joint. $\times 438$.
 12.—*C. biarticulatum*, tenth joint. $\times 630$.
 13.—*C. mendosum*, tenth joint. $\times 410$.
 14.—*C. australe*, tenth joint. $\times 480$.
 15.—*C. australe* var. *austrinorum*, tenth joint. $\times 512$.

Note.—The magnifications of Messrs. West, Newman & Co.'s drawings are approximate only. The drawings were made on squared paper, with the assistance of an eyepiece micrometer, and in many cases have been reduced to fit the plates.

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1b

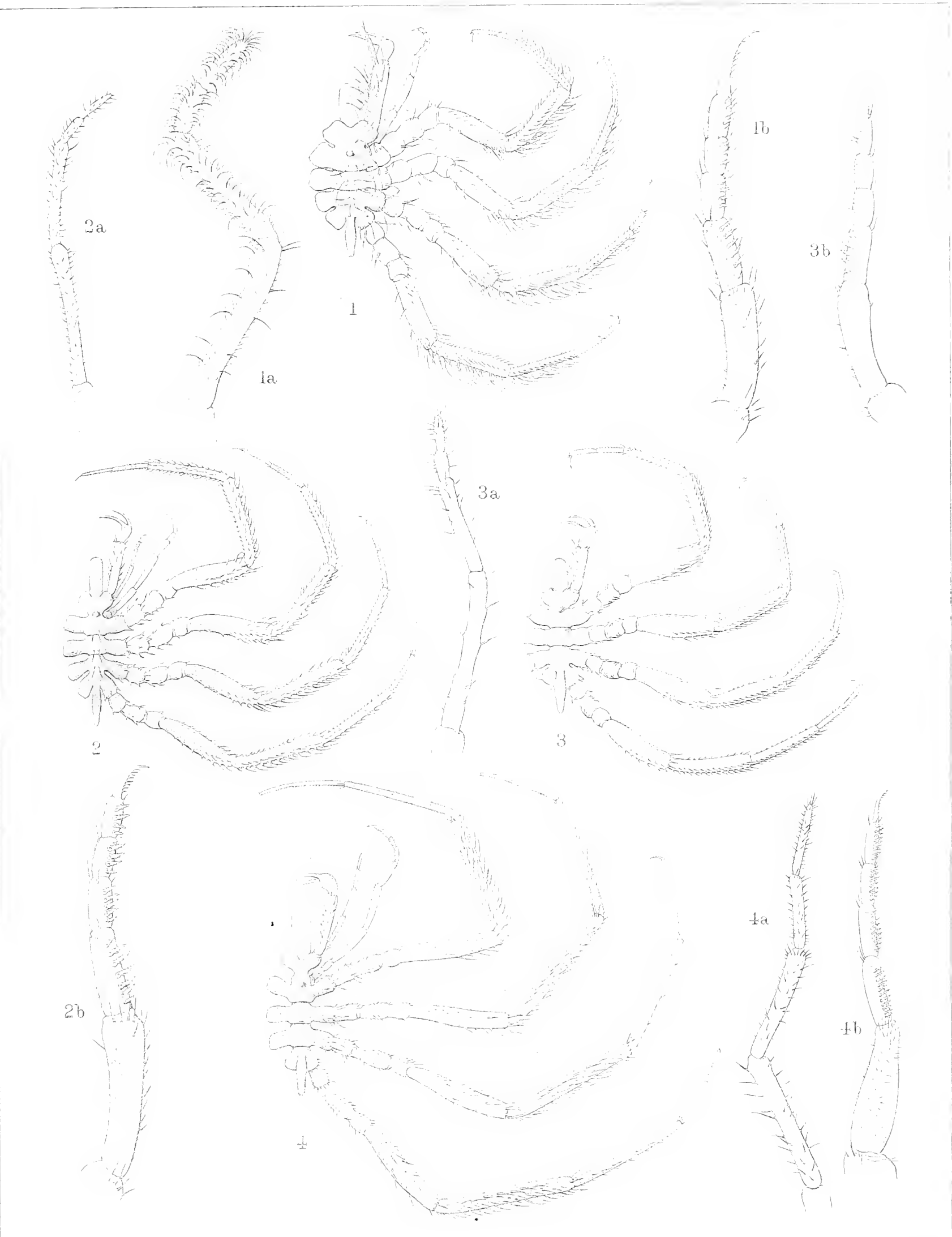


1a



3a

3



Chestonymphon.

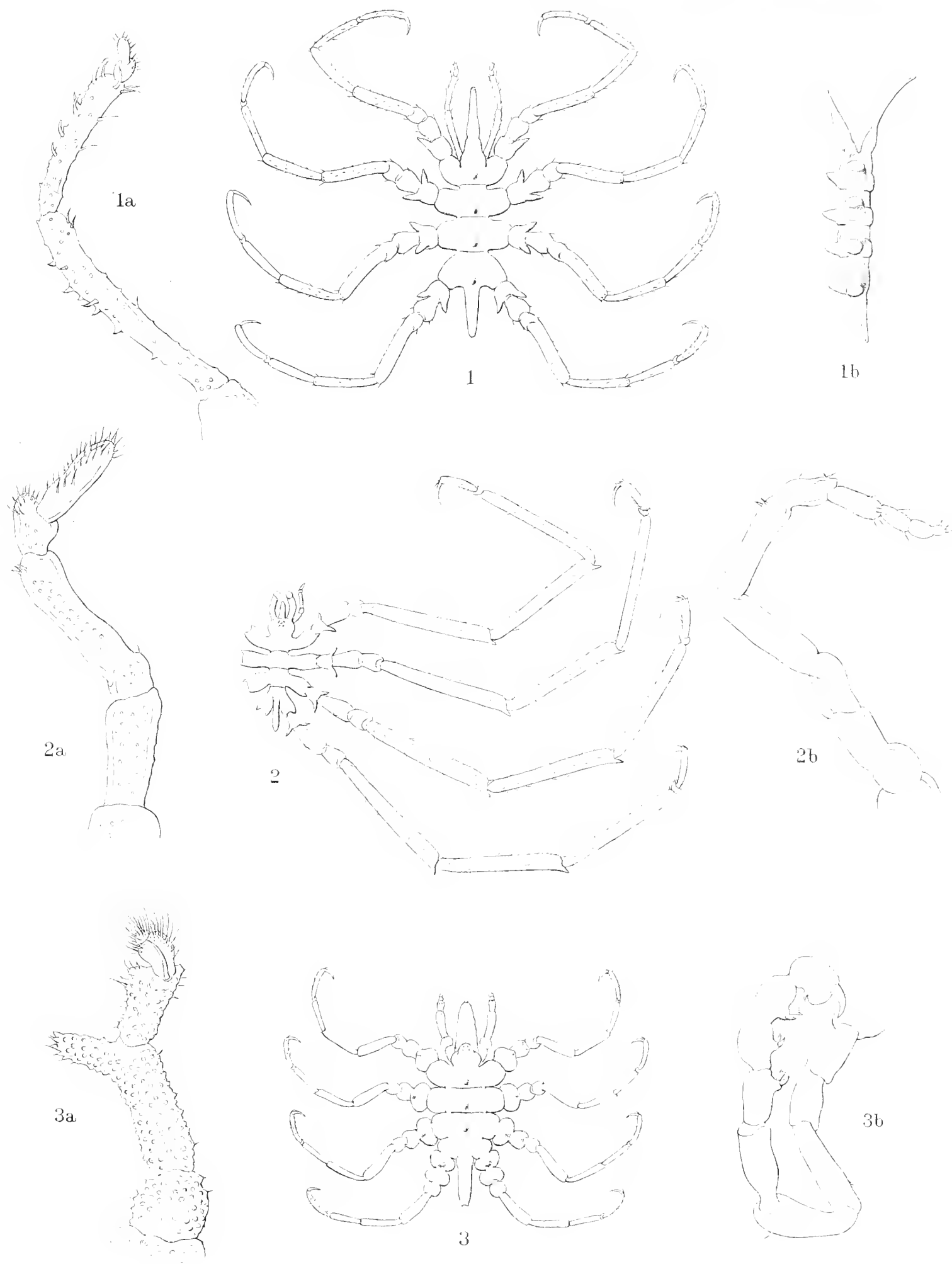
- | | |
|-----------------|----------------------|
| 1. C. villosum. | 2. C. biarticulatum. |
| 3. C. mendosum. | 4. C. austrinorum. |

West, Newman del et lith.



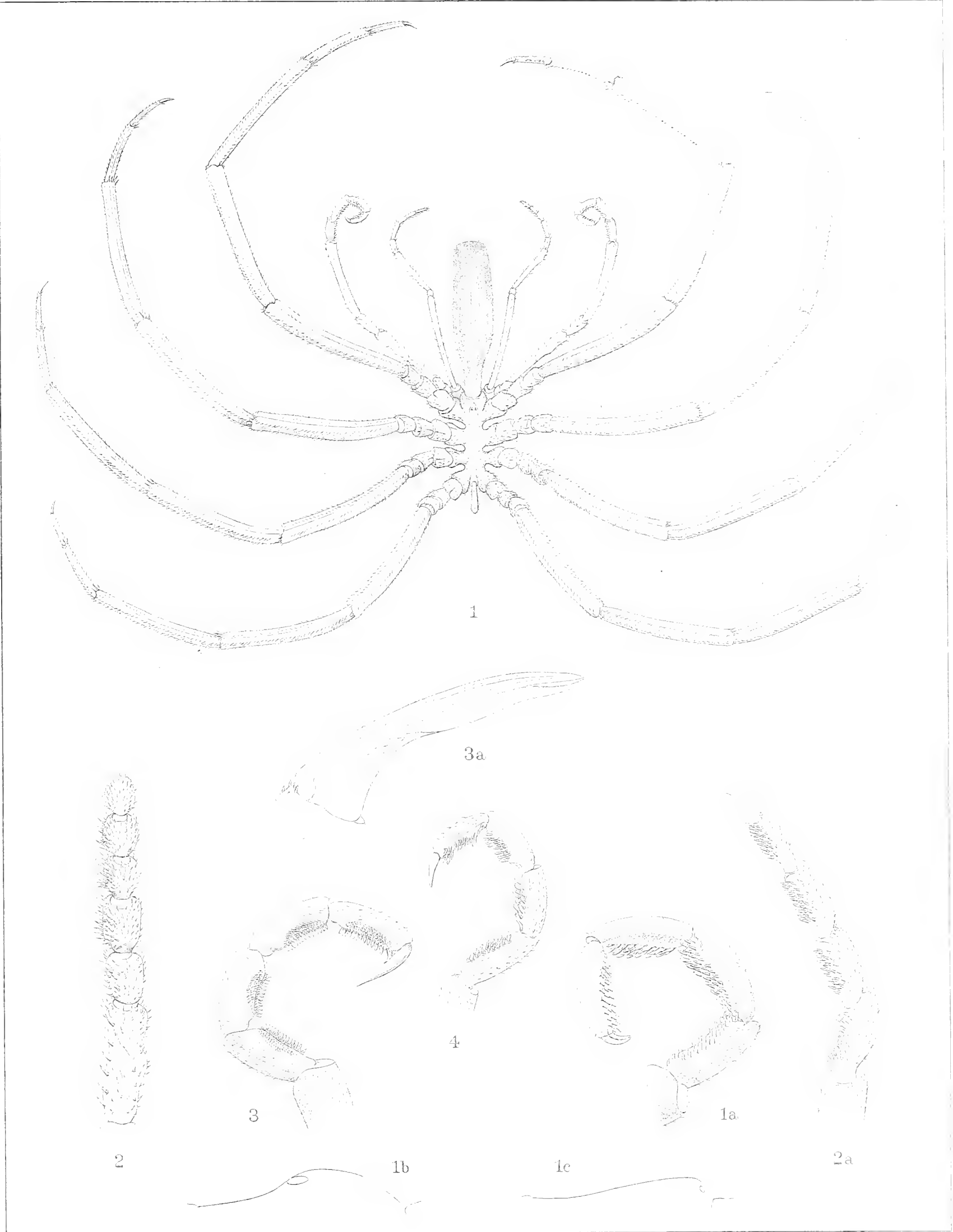


1. L. grande. 2. L. minus.



West Newman del et lith.

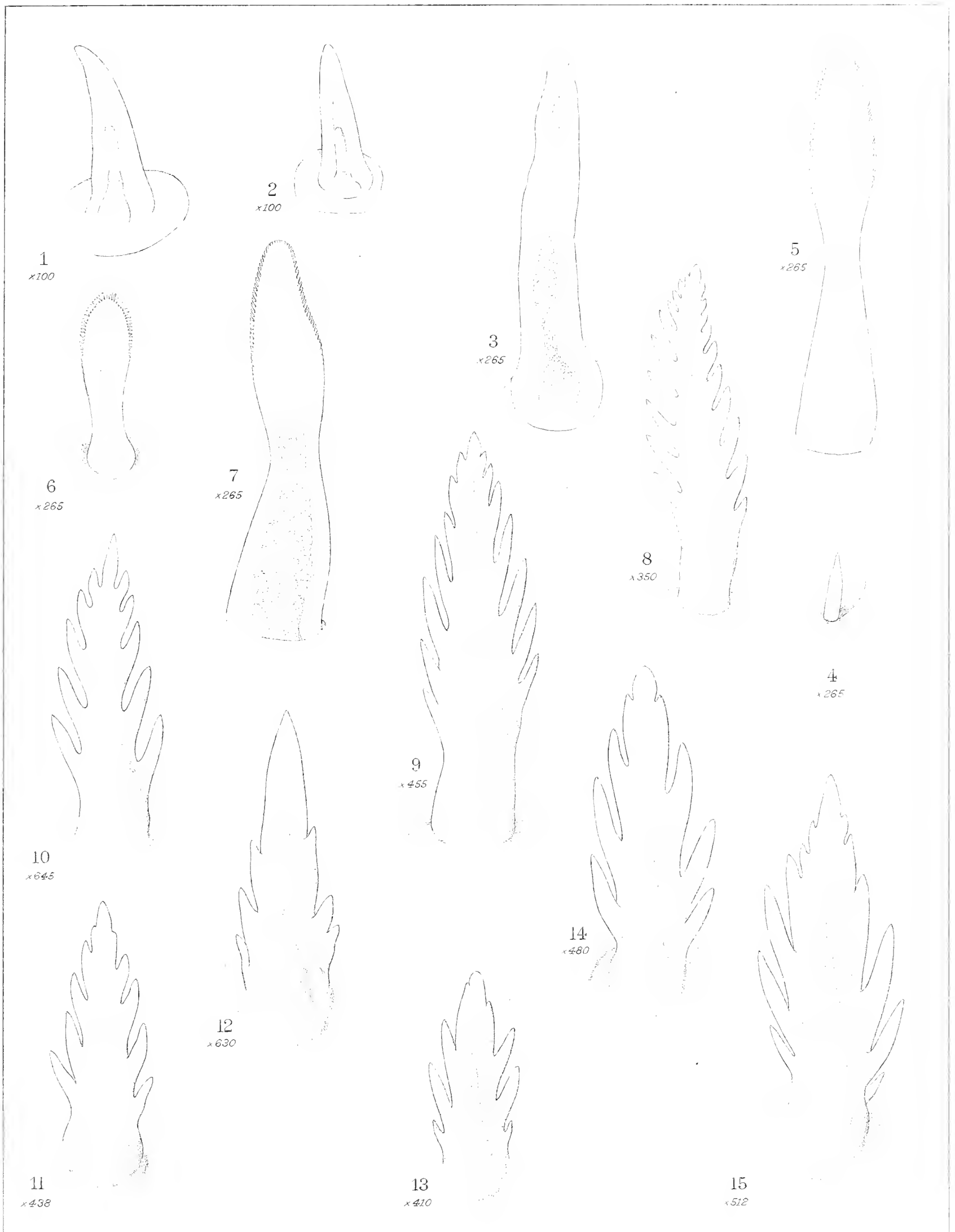
1. *Austrodecus glaciale*. 2. *Austroraptus polaris*. 3. *Rhynchothorax australis*.



E.W.Sexton ad nat.del.

West Newman del.

Colossendeis.
1. C.australis. 2. C.glacialis. 3. C.frigida. 4. C.rugosa



Figs 1-7 E.W. Sexton del.

Figs 8-15 West, Newman del. et lith.

Figs 1 & 2. *Colossendeis australis*. Figs 3 & 4. *C. glacialis*. Figs 5 & 6. *C. frigida*. Fig 7. *C. rugosa*.

Fig. 8. *Nymphon hiemale*. Fig. 9. *N. lanare*. Fig. 10. *N. frigidum*.

Fig. 11. *Chætonymphon villosum*. Fig. 12. *C. biarticulatum*. Fig. 13. *C. mendosum*.

Fig. 14. *C. australe*. Fig. 15. *C. eustrinorum*.

